



04-RCA-0006

Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

0060567

OCT 9 2003

Mr. E. R. Skinnarland
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336

RECEIVED
OCT 21 2003

EDMC

Dear Mr. Skinnarland:

QUARTERLY NOTIFICATION OF CLASS 1 MODIFICATIONS TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) PERMIT, DANGEROUS WASTE (DW) PORTION (QUARTER ENDING SEPTEMBER 30, 2003, PERMIT CONDITION I.C.3)

In accordance with Condition I.C.3 of the RCRA Permit, DW Portion, enclosed for your notification are the Class 1 modifications. Modifications this quarter included updating information in the List of Attachments, Part II, and Part III of the RCRA Permit, DW Portion. The List of Attachments Class 1 modifications pertain to Attachment 6, Hanford Well Maintenance and Inspection Plan. The Part II Class 1 modifications pertain to General Conditions II.U.3 and II.V. The Part III Class 1 modifications pertain to the 305-B Storage Facility and the Waste Treatment and Immobilization Plant. The Class 1 modifications are made to ensure that all activities are conducted in compliance with the RCRA Permit, DW Portion.

If you have any questions, please contact Anthony C. McKarns, Regulatory Compliance and Analysis Division, on (509) 376-8981.

Joel Hebdon, Director
Regulatory Compliance and Analysis Division
U.S. Department of Energy
Richland Operations Office

Richard H. Gurske, Director
Environmental Protection
Fluor Hanford, Inc.

Roby D. Enge, Director
Environment, Safety, Health and Quality
Pacific Northwest National Laboratory

J.P. Henschel
Project Director
Bechtel National, Inc.

RCA:ACM

Enclosures

cc: See page 2

Mr. E. R. Skinnarland
04-RCA-0006

-2-

OCT 9 2003

Enclosures

cc w/encls:

F. W. Bond, Ecology
L. J. Cusack, Ecology
B. G. Erlandson, BNI
S. Harris, CTUIR
A. K. Ikenberry, PNNL
F. C. Jamison, Ecology
R. Jim, YN
R. J. Landon, BHI
P. Sobotta, NPT
S. A. Thompson, FHI
M. A. Wilson, Ecology
J. E. Rasmussen, DOE-ORP
HF Operating Record, H8-12
Ecology NWP Kennewick Library
Environmental Portal, LMSI
Admin Record

cc w/o encls:

M. Y. Anderson-Moore, Ecology
J. B. Price, Ecology
J. P. Henschel, BNI
R. H. Gurske, FHI
R. D. Enge, PNNL

Hanford Facility RCRA Permit Modification Notification Forms

General Permit Conditions

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Page 3 of 3: Permit Condition II.V

Hanford Facility RCRA Permit Modification Notification Form

Unit: Hanford Facility RCRA Permit	Permit Part & Chapter: Part II, General Conditions
--	--

Description of Modification:

Permit Condition II.U.3:

This modification updates the conditions to reflect the current status of mapping efforts.

II.U.3 The Permittees shall maintain piping maps for existing, newly identified, and/or new dangerous waste underground pipelines (including active, inactive, and abandoned pipelines, which contain or contained dangerous waste subject to the provisions of Chapter 173-303 WAC) ~~at the Hanford Facility within the 200 East, 200 West, 300, 400, 100N, and 100K Areas.~~ The maps shall identify the origin, destination, direction of flow, size, depth and type (i.e., reinforced concrete, stainless steel, cast iron, etc.), of each pipe, and the location of their diversion boxes, valve pits, seal pots, catch tanks, receiver tanks, and pumps, and utilize Washington State Plane Coordinates, NAD 83(91), meters. If the type of pipe material is not documented on existing drawings, the most probable material type shall be provided. The maps shall also identify whether the pipe is active, inactive, or abandoned. The age of all pipes requiring identification pursuant to this Condition shall be documented in an Attachment to the submittal. If the age cannot be documented, an estimate of the age of the pipe shall be provided based upon best engineering judgment. These maps need not include the pipes within a fenced tank farm or within a building/structure. These maps shall be compiled using documented QA/QC control methods and procedures outlined in DOE/RL-96-50, Hanford Facility RCRA Permit Mapping and Marking of Dangerous Waste Underground Pipelines Report, September 1996. These maps and any Attachments shall be maintained in the Facility Operating Record and be updated annually as required by Condition II.U.4.

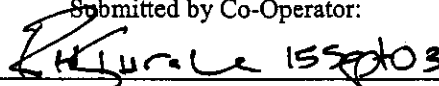

Modification Class: ¹²³	Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and Informational changes.

Submitted by Co-Operator:  R. H. Gurske	Reviewed by RL Program Office  J. B. Hebdon	Reviewed by Ecology: E. R. Skinnarland
15 Sep 03 Date	10/9/03 Date	 Date

¹ Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit: Hanford Facility RCRA Permit	Permit Part & Chapter: Part II, General Conditions
--	--

Description of Modification:

Permit Condition II.V

*This modification updates the conditions to reflect the current status of mapping efforts.***II.V MARKING OF UNDERGROUND PIPING**

The Permittees shall maintain marking of underground pipelines located outside the 200 East, 200 West, 300, 400, 100N, and 100K Areas identified in Condition II.U.3. These pipelines shall be marked at the point they pass beneath an area fence enclosing the 200 East, 200 West, 300, 400, 100N, or 100K Areas, at their origin and destination, at any point they cross an improved road, and every 100 meters along the pipeline corridor where practicable. The markers shall be labeled with a sign that reads "Buried Dangerous Waste Pipe" and shall be visible from a distance of fifteen (15) meters.

Modification Class: ¹²³	Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and Informational changes.

Submitted by Co-Operator: <i>R. H. Gurske</i> 15 Sept 03	Reviewed by RL Program Office <i>Paul Hebdon</i> 10/9/03	Reviewed by Ecology:
R. H. Gurske Date	J. B. Hebdon Date	E. R. Skinnarland Date

¹ Class 1 modifications requiring prior Agency approval.² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Forms

List of Attachments

Quarter Ending September 30, 2003

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Page 4 of 6: Attachment 6, Section 3.0
Page 5 of 6: Attachment 6, Section 6.0
Page 6 of 6: Attachment 6, Section 7.0

Hanford Facility RCRA Permit Modification Notification Form

Unit:
Attachment 6

Permit Part & Chapter:
List of Attachments

Description of Modification:

Remove Attachment 6 and replace with the attached Attachment 6.

LIST OF ATTACHMENTS

Attachment 6 Hanford Well Maintenance and Inspection Plan (as amended), BHI-01265, ~~Revision 0, May 1999~~

Modification Class: ¹²³

Class 1

Class ¹1

Class 2

Class 3

Please check one of the Classes:

X

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation:

A. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:

Reviewed by DOE Program Office:

Reviewed by Ecology:

R. T. Wilde

Date

M. S. McCormick

Date

E. R. Skinnarland

Date

¹ Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

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Hanford Facility RCRA Permit Modification Notification Form

Unit: Attachment 6	Permit Part & Chapter: List of Attachments
------------------------------	--

Description of Modification:

Remove Attachment 6 and replace with the attached Attachment 6.
Attachment 6

1.0 INTRODUCTION

This document presents the well maintenance and inspection plan for use in supporting groundwater activities at the Hanford Site. Wells located across the Hanford Site are used by Site contractors for a variety of groundwater programs. As such, these wells require various types of maintenance during their lifecycles. The wells that must be maintained are defined in Section 2.0, Requirements, ~~defines wells that must be maintained.~~ The Well Maintenance Program is the responsibility of Bechtel Hanford, Inc. (BHI). The maintenance/inspection program is designated as routine maintenance.

Modification Class: ¹²³	Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation:

A. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator: <i>RT Wilde</i> R. T. Wilde	Reviewed by DOE Program Office: <i>Shirley Ann</i> M. S. McCormick	Reviewed by Ecology: E. R. Skinnarland
<i>9-23-03</i> Date	<i>10-8-03</i> Date	 Date

¹ Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification Form

Unit: Attachment 6	Permit Part & Chapter: List of Attachments								
<u>Description of Modification:</u> Attachment 6 3.0 SCHEDULE The list of wells to be considered for routine maintenance is developed based on a review of the past 4 years sampling history, the fiscal year sampling schedule, and the proposed 3-year sampling schedule. Routine maintenance priority is established by reviewing the following: <ul style="list-style-type: none"> Whether the well is subject to RCRA permit requirements, or Elapsed time since the last routine maintenance action or construction date (priority on longer duration). The schedule, which (see Appendix A) is generated, tracked and formulated by the Hanford Well Information System (HWIS), and consists of a schedule that is sufficiently flexible to accommodate changes that will occur with the addition of new wells, adjustments in the TSD unit closures, and wells that are no longer needed for monitoring. The schedule will also accommodate wells used by other programs.									
Modification Class: ¹²³	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="width: 25%;">Class 1</td> <td style="width: 25%;">Class ¹1</td> <td style="width: 25%;">Class 2</td> <td style="width: 25%;">Class 3</td> </tr> <tr> <td>X</td> <td></td> <td></td> <td></td> </tr> </table>	Class 1	Class ¹ 1	Class 2	Class 3	X			
Class 1	Class ¹ 1	Class 2	Class 3						
X									
Please check one of the Classes:									
Relevant WAC 173-303-830, Appendix I Modification: A.1.									
<u>Enter wording of the modification from WAC 173-303-830, Appendix I citation:</u>									
A. General Permit Provisions 1. Administrative and Informational changes									
Submitted by Co-Operator: R. T. Wilde 9-23-03 Date	Reviewed by DOE Program Office: M. S. McCormick 10-8-03 Date								
Reviewed by Ecology: E. R. Skinnarland Date									

¹ Class 1 modifications requiring prior Agency approval.

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Hanford Facility RCRA Permit Modification Notification Form

Unit:
Attachment 6Permit Part & Chapter:
List of AttachmentsDescription of Modification:

Remove Attachment 6 and replace with the attached Attachment 6.
Attachment 6

6.0 MANAGEMENT AND CONTROL

Well maintenance activities will be performed by subcontract using approved subcontractor procedures, quality assurance and quality control plans, health and safety plan, and other appropriate and/or required documentation. Program environmental requirements documents are used to evaluate the adequacy of subcontractor procedures and plans to guide and control the well maintenance activities. Program implementation and procedural compliance will be monitored periodically through surveillance and self-assessments. The following will control environmental compliance, quality assurance, and reporting:

BHI-EE-02, Program Environmental Requirements, documents establishes the overall environmental compliance requirements for BHI.

Program implementation and procedural compliance will be monitored periodically through surveillance and self-assessments.

Well maintenance activities will be documented and transmitted for entry into the HWIS Hanford Well Information System Database. Inspections ~~are to~~ will be recorded in the RCRA operating records, where necessary. All documentation shall be submitted to the Hanford Facility Operating Record, Unit-Specific file Document and Information Services.

Modification Class: ¹²³

Class 1

Class ¹1

Class 2

Class 3

Please check one of the Classes:

X

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation:

A. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:

Reviewed by DOE Program Office:

Reviewed by Ecology:

R. T. Wilde

Date

M. S. McCormick

Date

E. R. Skinnarland

Date

¹ Class 1 modifications requiring prior Agency approval.² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:
Attachment 6Permit Part & Chapter:
List of AttachmentsDescription of Modification:

Remove Attachment 6 and replace with the attached Attachment 6.
Attachment 6

7.0 REFERENCES

~~BHI EE-02, Environmental Requirements, Bechtel Hanford, Inc., Richland, Washington.~~

DOE-RL, Hanford Facility Wide RCRA Permit, as revised, Permit No. WA7890008967, expiration date September 27, 2004.

Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, et seq.

RCW 18.104, "Well Construction," *Revised Code of Washington*, as amended.

RCW 70.105, "State of Washington Hazardous Waste Management Act of 1976," *Revised Code of Washington*, as amended.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*, as amended.

Modification Class: ¹²³

Class 1

Class ¹1

Class 2

Class 3

Please check one of the Classes:

X

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation:

A. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:

Reviewed by DOE Program Office:

Reviewed by Ecology:

R. T. Wilde

Date

M. S. McCormick

Date

E. R. Skinnarland

Date

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Hanford Facility RCRA Permit Modification Notification Forms

List of Attachments

Quarter Ending September 30, 2003

Replacement

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Attachment 6

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7	6.0	Management and Control	Att 6.2
8	7.0	References	Att 6.2

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HANFORD WELL MAINTENANCE AND INSPECTION PLAN

1.0 INTRODUCTION

This document presents the well maintenance and inspection plan for use in supporting groundwater activities at the Hanford Site. Wells located across the Hanford Site are used by Site contractors for a variety of groundwater programs. As such, these wells require various types of maintenance during their lifecycles. The wells that must be maintained are defined in Section 2.0, Requirements defines wells that must be maintained.

2.0 REQUIREMENTS

The *Revised Code of Washington* ([RCW] 18.104), as amended, states that the property owner is required to maintain wells to guard against waste and contamination of the groundwater resources. In addition, RCW 18.104 empowers the Washington State Department of Ecology (Ecology) to adopt rules for the maintenance of wells and their casings. These rules and regulations are contained in *Washington Administrative Code* (WAC) 173-160, "Minimum Standards for Construction and Maintenance of Wells," issued by Ecology.

The provisions of the dangerous waste section of the *Resource Conservation and Recovery Act of 1976 Permit for the Treatment, Storage, and Disposal of Dangerous Waste at the Hanford Site* Permit are controlled by the "State of Washington Hazardous Waste Management Act of 1976" (RCW 70.105). Part II.F.2.a of Ecology 1994 states *...the Permittees shall inspect the integrity of active resource protection wells as defined by WAC 173-160-030 subject to this Permit at least once every five (5) years.* Wells subject to the RCRA Permit requirements are defined as wells actively monitoring treatment, storage, and disposal (TSD) unit closures (in Part V of the Permit); TSD operating units (in Part III of the Permit); and TSD units undergoing post-closure/modified closure (Part VI of the Permit).

Additionally, the "Second Responsiveness Summary" section (Ecology 1994), which discusses interpretation of the RCRA Permit (found in Part II.F.2.a, page 99), states that Ecology requires maintenance inspections because of the likelihood that monitoring wells can act as preferential pathways for the migration of contaminants. Although the inspections are only required for the wells subject to the Permit, Ecology further states that *...the Department will pursue enforcement action outside of this Permit to assess and remediate and/or abandon, where applicable, those wells not being addressed by this Permit.*

Groundwater monitoring wells included in the maintenance/inspection plan are determined by the RCRA permit and various programs such as the Hanford Site Groundwater/Vadose Zone Integration Project. Maintenance of wells supporting other programs or projects across the Hanford Site may be included in the maintenance schedule at the request of the program manager.

3.0 SCHEDULE

The list of wells to be considered for routine maintenance is developed based on a review of the past 4 years sampling history, the fiscal year sampling schedule, and the proposed 3-year sampling schedule. Routine maintenance priority is established by reviewing the following:

- Whether the well is subject to RCRA permit requirements, or
- Elapsed time since the last routine maintenance action or construction date (priority on longer duration).

- 1 RCW 18.104, "Well Construction," *Revised Code of Washington*, as amended.
- 2 RCW 70.105, *State of Washington Hazardous Waste Management Act of 1976, Revised Code of*
- 3 *Washington*, as amended.
- 4 WAC 173-160, *Minimum Standards for Construction and Maintenance of Wells, Washington*
- 5 *Administrative Code*, as amended.

**Hanford Facility RCRA Permit Modification Notification Forms
Part III, Chapter 2 and Attachment 18
305-B Storage Facility**

Quarter Ending September 30, 2003

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Page 6 of 6: Chapter 8.0, Table 8-1

Hanford Facility RCRA Permit Modification Notification Form					
Unit: 305-B Storage Facility		Permit Part & Chapter: Part III, Chapter 2 and Attachment 18			
<p><u>Description of Modification:</u></p> <p>Hanford Facility RCRA Permit, Condition III.2.A:</p> <p>III.2.A. <u>COMPLIANCE WITH APPROVED PERMIT APPLICATION</u></p> <p>The Permittees shall comply with all the requirements set forth in Attachment 18, including all Class 1 Modifications specified below, and the Amendments specified in Condition III.2.B. Enforceable portions of the permit application have been incorporated in Attachment 18 and are identified as follows. All subsections, figures, and tables included in these portions are also enforceable, unless stated otherwise:</p> <p>ATTACHMENT 18:</p> <p>Chapter 1.0 Part A, Form 3, Permit Application, Revision 1C, from Class 1 Modification for quarter ending September 30, 2002</p> <p>Chapter 2.0 Unit Description, from Class 1 modification for quarter ending March 31, 2003</p> <p>Chapter 3.0 Waste Analysis Plan, from Class 1 Modification for quarter ending June September 30, 2003</p> <p>Chapter 4.0 Process Information, from Class 1 Modification for quarter ending September 30, 2002</p> <p>Chapter 6.0 Procedures to Prevent Hazards, from Class 1 Modification for quarter ending June 30, 2003</p> <p>Chapter 7.0 Building Emergency Procedure, from Class 1 Modification for quarter ending June 30, 2003</p> <p>Chapter 8.0 Personnel Training, from Class 1 Modification for quarter ending September 30, 2003²</p> <p>Chapter 11.0 Closure and Post-Closure Requirements, from Class 1 Modification for quarter ending September 30, 2002</p> <p>Chapter 12.0 Reporting and Recordkeeping, from Class 1 Modification for quarter ending September 30, 2002</p> <p>Chapter 13.0 Other Relevant Laws, from Class 1 Modification for quarter ending September 30, 2002</p> <p>III.2.B. <u>AMENDMENTS TO THE APPROVED PERMIT APPLICATION</u></p> <p>III.2.B.1. For all shipments of dangerous waste to or from this TSD unit, except for shipments which occur wholly within the 300 Area, the Permittees shall comply with Conditions II.P. and II.Q. of this Permit regarding dangerous waste shipment manifesting and transportation.</p>					
Modification Class: ¹²³		Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:		X			
Relevant WAC 173-303-830, Appendix I Modification: A.1.					
<p><u>Enter wording of the modification from WAC 173-303-830, Appendix I citation</u></p> <p>A. General Permit Provisions</p> <p>1. Administrative and Informational changes</p>					
Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:		
<i>A.K. Ikenberry</i> 9-11-03 A.K. Ikenberry Date	<i>R.F. Christensen</i> 9/16/03 R.F. Christensen Date	 F. Jamison Date	 E. R. Skinnarland Date		

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³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1. if appropriate.

Hanford Facility RCRA Permit Modification Notification Form				
Unit: 305-B Storage Facility	Permit Part & Chapter: Part III, Chapter 2 and Attachment 18			
Description of Modification: Chapter 3.0: Replace Chapter 3.0 with the attached Chapter 3.0. Replaced 'RMW' with 'mixed waste'.				
Modification Class: ¹²³	Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:	X			
Relevant WAC 173-303-830, Appendix I Modification: A.1.				
<u>Enter wording of the modification from WAC 173-303-830, Appendix I citation</u>				
A. General Permit Provisions				
1. Administrative and Informational changes				
Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:	
<i>A.K. Ikenberry</i> 9-11-03	<i>R.F. Christensen</i> 9/14/03			
A.K. Ikenberry Date	R.F. Christensen Date	F. Jamison Date	E. R. Skinnarland Date	

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Hanford Facility RCRA Permit Modification Notification Form

Unit:
305-B Storage Facility

Permit Part & Chapter:
Part III, Chapter 2 and Attachment 18

Description of Modification:

Chapter 3.0, Section 3.1: Replace Chapter 3.0 with the attached Chapter 3.0.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste and mixed waste stored at 305-B Storage Facility can be categorized as originating from five basic sources:

- Listed Waste from specific and nonspecific sources
- Discarded commercial chemical products
- ☒ ~~Waste from research activities using radioactive isotopes~~
- Waste from chemicals synthesized or created in research laboratories
- Discarded commercial products exhibiting dangerous waste characteristics and/or criteria.

...

Mixed Waste from Research Activities Using Radioactive Isotopes. ~~Dangerous Mixed wastes from can be generated by research and analytical activities using radioactive isotopes are RMW.~~ These wastes are generated in laboratories performing chemical and physical research, ~~and consist primarily of radiologically contaminated chemicals.~~ These wastes are designated on the basis of the generator's knowledge or on the basis of sampling and analysis. The generator's knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste. For example, many generating units keep log sheets for accumulation containers in satellite areas to keep a record of waste constituents. If information available from the generator is inadequate for waste designation, the wastes are sampled and the results of the analysis are used for designation. These wastes include those designated as state only dangerous waste under WAC 173-303-100 and also those designated as characteristic dangerous waste under WAC 173-303-090. Attachment 18, Chapter 1.0, Part A, Form 3, includes all categories of toxic, and persistent, waste (i.e., both DW and EHW). The wide variety of research activities conducted at Hanford presents the potential that these wastes could be generated and requires subsequent management at 305-B Storage Facility. Similarly, Attachment 18, Chapter 1.0, Part A, Form 3, includes the characteristic dangerous waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and TCLP toxic due to metals or organics content).

Modification Class: ¹²³

Please check one of the Classes:

Class 1

Class ¹1

Class 2

Class 3

X

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

B. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:
<i>A.K. Ikenberry</i> 9-14-03	<i>R.F. Christensen</i> 9/16/03		
A.K. Ikenberry Date	R.F. Christensen Date	F. Jamison Date	E. R. Skinnarland Date

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Hanford Facility RCRA Permit Modification Notification Form

Unit:
305-B Storage Facility

Permit Part & Chapter:
Part III, Chapter 2 and Attachment 18

Description of Modification:

Chapter 3.0, Table 3-1: Replace Chapter 3.0 with the attached Chapter 3.0.

Table 3-1. Summary of Test Parameters, Rationales, and Methods

Parameter ^a	Method ^b	Rationale for Selection
Physical Screening		
Visual inspection	Field method - observe phases, presence of solids in waste	Confirm that waste matches that described on waste acceptance documentation; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Chemical Screening		
Water miscibility/separable organics ^c	Water mix screen ASTM Method D5232-92	Confirm that waste matches that described on waste acceptance documentation; identify separable organics; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Oxidizer	Oxidizer Screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
pH	pH screen SW-846 Method 9041	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Cyanides	Cyanide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Sulfides	Sulfide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Flashpoint	Flashpoint measurement instrument	Confirm that waste matches that described on waste acceptance documentation
Halogenated/Volatile Organic Compounds	Photoionizer or Flame Ionizer, or Clor-D-Test © Kits	Confirm that waste matches that described on waste acceptance documentation
Pre-Shipment Review		
Mercury (total)	Generator knowledge or SW-846 Method 7470/7471	Identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria.
Toxicity characteristic organic compounds	Generator knowledge or SW-846 Methods 1311 and 8260 (volatile organic compounds) and 8270 (semivolatile organic compounds)	Identify waste not identified on the Part A, Form 3
Polycyclic aromatic hydrocarbons	Generator knowledge or SW-846 Method 8270 or 8100	Identify waste not identified on the Part A, Form 3 (for waste with >1% solids and for which WP03 could apply)

^a Addition parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.

^b Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.

^c These test will not be performed on materials known to be organic peroxides, ether, and/or water reactive compounds.

Modification Class: ¹²³

Please check one of the Classes:

Class 1	Class ¹ 1	Class 2	Class 3
X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

C. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:
<i>A.K. Ikenberry</i> 9-1-03	<i>R.F. Christensen</i> 9/16/03		
A.K. Ikenberry Date	R.F. Christensen Date	F. Jamison Date	E. R. Skinnarland Date

¹ Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modification Notification Form

Unit:
305-B Storage Facility

Permit Part & Chapter:
Part III, Chapter 2 and Attachment 18

Description of Modification:

Chapter 8.0, Table 8-1: Replace Chapter 8.0 with the attached Chapter 8.0

Table 8-1. 305-B Storage Facility Training Matrix

	Training Category*				
Attachment 33, General Information Portion, Chapter 8.0 Training (DOE/RL-91-28) Category	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training	
305-B Storage Facility	Orientation Program	Building Emergency Plan	Building Emergency Director Training	Advanced Waste Management Training	Container Management
Staff Position					
Technical Group Lead Unit Operations Supervisor	X	X	X	X	X
Hazardous Waste Operations Staff Waste Management Engineers	X	X	X ¹	X	X
Waste Management Technicians and Scientist/Engineering Associates	X	X	X ¹	X	X
Waste Management Clerks	X	X		X	

¹ Required for any staff that has been assigned the duties of Building Emergency Director or alternate.

* Refer to the 305-B Storage Facility Training Plan for a complete description of coursework in each training category.

Modification Class: ¹²³	Class 1	Class ¹ 1	Class 2	Class 3
Please check one of the Classes:	X			

Relevant WAC 173-303-830, Appendix I Modification: A.1.

Enter wording of the modification from WAC 173-303-830, Appendix I citation

A. General Permit Provisions

1. Administrative and Informational changes

Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:
<i>A.K. Ikenberry</i> 9-11-03	<i>R.F. Christensen</i> 9/14/03		
A.K. Ikenberry Date	R.F. Christensen Date	F. Jamison Date	E. R. Skinnarland Date

¹ Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

**Hanford Facility RCRA Permit Modification
Part III, Chapter 2 and Attachment 18
305-B Storage Facility**

Quarter Ending September 30, 2003

Replacement Chapters

Index

Chapter 3.0

Chapter 8.0

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3.0 WASTE ANALYSIS [C]

The purpose of this Waste Analysis Plan (WAP) is to document the waste acceptance process, sampling methodologies, analytical techniques, and processes that are undertaken for sampling and analysis of dangerous and or mixed waste managed in the 305-B Storage Facility.

This chapter also provides information on the chemical, biological, and physical characteristics of the waste stored at the 305-B Storage Facility.

3.1 CHEMICAL, BIOLOGICAL, AND PHYSICAL ANALYSIS

The dangerous waste and mixed waste stored at 305-B Storage Facility can be categorized as originating from five basic sources:

- Listed Waste from specific and nonspecific sources
- Discarded commercial chemical products
- Waste from chemicals synthesized or created in research laboratories
- Discarded commercial products exhibiting dangerous waste characteristics and/or criteria.

Each of these waste categories is discussed below, including waste descriptions, hazard characteristics, and bases for hazard designations. This information includes that which must be known to treat, store, or dispose of the waste, as required under WAC 173-303-806(4)(a)(ii).

Listed Waste from Specific and Nonspecific Sources. Wastes from specific and nonspecific sources consist of those listed wastes identified in WAC 173-303-9904. Attachment 18, Chapter 1.0, Part A, Form 3, identifies the waste from this category with their estimated annual management quantities.

Halogenated and nonhalogenated solvents are in the form of spent solvents. Degreasing solvents (F001), as well as spent halogenated solvents (F002), are used primarily in research although some commercial applications do exist (e.g., printing, duplicating). Spent non-halogenated solvents (F003, F004, and F005) also come primarily from research laboratories, although some is generated through maintenance applications. Manufacturing activities are not performed at Hanford; therefore, dangerous waste from specific sources (WAC 173-303-9904 "K" Waste) typically is not generated at PNNL. However, small quantities of K-listed waste have been generated from treatability studies and sample characterization activities at PNNL from time to time and could be stored at 305-B Storage Facility. W001 state source waste (PCB electrical equipment waste) has been generated in limited amounts in the past and could be stored at 305-B Storage Facility if other generation activities occur.

F-listed waste is designated on the basis of process knowledge (i.e., information from container labels or material safety data sheets), or by sampling. Sampling is performed if the generating unit does not have sufficient information to document the composition and characteristics of the waste. The waste generator is responsible for specifying the characteristics of the waste on the basis of knowledge of the chemical products used (i.e., information supplied by the manufacturer) and the process generating the waste. These listed wastes are all designated as dangerous waste (DW) or extremely hazardous waste (EHW) based on the criteria given in WAC 173-303-100.

Discarded Chemical Products. Discarded chemical products consist of those products described in WAC 173-303-081. The Part A, Form 3, for 305-B Storage Facility identifies all of the discarded chemical products listed in WAC 173-303-9903 and specifies an estimated maximum annual management quantity, based on prior experience. Attachment 18, Chapter 1.0, Part A, Form 3, lists all of these waste

codes, however, because the wide variety of research activities conducted at Hanford presents the potential to generate any of these wastes.

These wastes (P waste and U waste) are typically received at 305-B Storage Facility in the manufacturer's original container. These containers typically consist of glass and polyethylene jars or bottles and metal cans that have a volume equal to or less than 4 liters.

Wastes in this category are designated on the basis of the generator's knowledge. As these waste are usually in original containers, information on the container label is verified by generator knowledge (i.e., knowledge that material is in its original container) and is used to identify contents. Waste in 'as procured' containers (i.e., original container with intact label) are not sampled. These listed wastes contain those designated as DW as well as those designated as EHW. These wastes are also subject to LDR regulations under 40 CFR 268, including disposal prohibitions and treatment standards.

Mixed Waste from Research Activities. Mixed wastes can be generated by research and analytical activities. These wastes are generated in laboratories performing chemical and physical research. These wastes are designated on the basis of the generator's knowledge or on the basis of sampling and analysis. The generator's knowledge is used if the generator has kept accurate records of the identities and concentrations of constituents present in the waste. For example, many generating units keep log sheets for accumulation containers in satellite areas to keep a record of waste constituents. If information available from the generator is inadequate for waste designation, the wastes are sampled and the results of the analysis are used for designation. These wastes include those designated as state only dangerous waste under WAC 173-303-100 and also those designated as characteristic dangerous waste under WAC 173-303-090. Attachment 18, Chapter 1.0, Part A, Form 3, includes all categories of toxic, and persistent, waste (i.e., both DW and EHW). The wide variety of research activities conducted at Hanford presents the potential that these wastes could be generated and requires subsequent management at 305-B Storage Facility. Similarly, Attachment 18, Chapter 1.0, Part A, Form 3, includes the characteristic dangerous waste categories D001 through D043 (i.e., ignitable, corrosive, reactive, and TCLP toxic due to metals or organics content).

Flammables (i.e., flash point less than 140° Fahrenheit) will not be stored in the below-grade mixed waste cell; however, ignitables (D001 due to oxidizer content) will be stored in this cell. Flammable mixed waste is not stored below grade due to Fire Code restrictions. These wastes are stored above the mixed waste cell in a flammable storage module. The flammable mixed waste module is equipped with secondary containment to provide greater than 100% secondary containment volume.

The waste in this category includes those designated as either DW or EHW. The waste could also be federal LDR waste regulated under 40 CFR 268 as well as state LDR waste regulated under WAC 173-303-140 (e.g., organic/carbonaceous waste).

Waste from Chemicals Synthesized or Created in Research Laboratories. Waste from chemicals synthesized or created in research laboratories typically consist of organics in quantities of 100 g or less, received in small containers.

These wastes are designated on the basis of the generator's knowledge or on the basis of sampling and analysis. The generator's knowledge is used if the generating unit has kept accurate records of the identities and concentrations of constituents present in the waste (e.g., log sheets for accumulation containers). If information available from the generating unit is inadequate for waste designation, the waste is sampled and the results of the analysis are used for designation. These wastes include those designated as state only dangerous waste under WAC 173-303-100 and also those designated as characteristic dangerous waste under WAC 173-303-090. The Part A, Form 3, for 305-B Storage Facility includes all categories of toxic, and persistent waste (i.e., both DW and EHW). The wide variety of

research activities conducted at Hanford presents the potential that these wastes could be generated and requires subsequent management at 305-B Storage Facility.

The waste in this category includes those designated as either DW or EHW. These wastes could also be federal LDR wastes regulated under 40 CFR 268 as well as state LDR wastes regulated under WAC 173-303-140 (e.g., organic/carbonaceous wastes).

Discarded Chemical Products Exhibiting Dangerous Waste Characteristics and/or Criteria. Many discarded chemical products handled in 305-B Storage Facility are not listed in WAC 173-303-9903 and are still considered dangerous waste since they exhibit at least one dangerous waste characteristic and/or criterion (WAC 173-303-090 and WAC 173-303-100). These wastes are included with those listed in the Attachment 18, Chapter 1.0, Part A, Form 3, under waste codes D001 through D043, WT01, WT02, WP01, WP02, and WP03.

Waste in this category is designated based on the generator's knowledge. As these wastes are usually in their original containers, information on the container label is verified by the generator's knowledge and is used to identify the contents. These wastes contain those designated as DW as well as those designated as EHW. These wastes could also be federal LDR waste regulated under 40 CFR 268 as well as state LDR waste regulated under WAC 173-303-140 (e.g., organic/carbonaceous waste).

3.1.1 Containerized Waste

The container storage areas at 305-B Storage Facility meet the containment system requirements of WAC 173-303-630(7)(c). Testing or documentation that the dangerous waste stored at 305-B Storage Facility does not contain free liquids is not required.

3.1.2 Waste in Tank Systems

This section does not apply to the 305-B Storage Facility because wastes are not stored in tanks.

3.1.3 Waste in Piles

This section does not apply to the 305-B Storage Facility because wastes are not stored in piles.

3.1.4 Landfill Waste

This section does not apply to the 305-B Storage Facility because wastes are not placed in landfills.

3.1.5 Waste Incinerated and Waste Used in Performance Tests

This section does not apply to the 305-B Storage Unit because wastes are not incinerated.

3.1.6 Waste to be Land Treated

This section does not apply to the 305-B Storage Facility because waste does not undergo land treatment.

3.2 WASTE ANALYSIS PLAN

This section describes the processes used to obtain the information necessary to manage waste in accordance with the requirements of WAC 173-303.

3.2.1 Facility Description

The 305-B Storage Facility is a dangerous waste and mixed waste storage unit owned and operated by the Department of Energy and co-operated by Pacific Northwest National Laboratory. The unit is used for the collection, consolidation, packaging, storage, and preparation for transport and disposal of both dangerous waste and mixed waste. It is an integral part of the Hanford Site's waste management system.

The 305-B Storage Facility is a one-story frame and masonry building with basement constructed in the early 1950s, with an attached two-story-high metal and concrete building constructed in January 1978, referred to in this document as the "high bay". The unit is located within the 300 Area, and was formerly used for engineering research and development. Unit upgrades were completed in 1988 to meet requirements for storage of dangerous waste and mixed waste. Waste storage under interim status began in March 1989.

3.2.2 Description of Facility Processes and Activities

A variety of small volume chemical wastes are generated by PNNL's research laboratory activities. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30 - 55-gallon drum. When a sufficient number of shipping containers of waste have accumulated, they are manifested for shipment, generally to permitted off-site recycling, treatment or disposal facilities.

Dangerous wastes are stored in the high bay. The high bay has been equipped with a secondary containment system to facilitate storage of containerized waste. In addition, four storage "cells" have been constructed within the high bay area for segregated storage of incompatible waste streams. Each of the cells is approximately 14' x 14', enclosed by 4' high concrete block walls; each cell has its own separate secondary containment system. Drum-quantity storage for incompatible waste is allowed in these cells and in separated areas of the high bay.

Mixed waste is stored in the basement of the original wing of the building in an area approximately 18' x 32'. Flammable mixed waste cannot be stored below grade (per Uniform Fire Code) and is stored in an independent area on the first floor of the original wing in the mixed waste flammable storage module.

Most of the information necessary to manage waste at 305-B Storage Facility is obtained from generating units without the need to perform detailed chemical, physical, and biological analysis. This approach is used for the following reasons:

- Wastes stored at 305-B Storage Facility are generated on the Hanford Site and/or by PNNL research programs; effective administrative control can be maintained over individual waste generating units (i.e., the same organization generates the waste and operates the storage unit)
- Wastes stored at 305-B Storage Facility may be discarded chemical products for which knowledge of waste characteristics is available without further analysis
- Most of the waste stored at 305-B Storage Facility is a result from research activities that are carefully controlled and documented; this documentation includes information on chemical constituents.

Information provided by waste generating units is verified before wastes are accepted for transport to 305-B Storage Facility (e.g., wastes are inspected to verify that they are as described in the disposal request). Generating units are not required to sample wastes unless they have inadequate process knowledge to designate waste, additional LDR information is needed, or visual verification failure occurs. Verification sampling of waste to be shipped offsite from 305-B Storage Facility is required by the disposal contractor as needed and the contractor performs these analyses.

Because of the importance of administrative controls for the purposes of waste analysis, processes for management of wastes from the time of generation through storage at 305-B Storage Facility are described below. These processes demonstrate how sufficient knowledge is obtained from generating units to properly manage dangerous and mixed waste at 305-B Storage Facility. In the event that such knowledge is not available, sampling and analysis is required by 305-B Storage Facility prior to shipment to the storage unit.

The 305-B Storage Facility personnel shall collect from the generating unit(s) the information pursuant to 40 CFR 268.7(a) regarding LDR wastes, the appropriate treatment standards, whether the waste meets the treatment standards, and the certification that the waste meets the treatment standards, if necessary, as well as any waste analysis data that supports the generator's determinations. If this information is not supplied by the generating unit, then the 305-B Storage Facility personnel shall be responsible for completion and transmittal of all subsequent information regarding LDR wastes, pursuant to 40 CFR 268.7(b). All waste streams must be re-characterized at least annually, or when generating unit and/or 305-B Storage Facility personnel have reason to believe the waste stream has changed, to determine compliance with LDR requirements in 40 CFR 268.

Volumetric Description of Waste. A wide range of waste volumes is collected from research and support activities. The largest unit container collected is a DOT container $<0.46 \text{ m}^3$, while the smallest is a trace amount in a small vial.

Large volume containers (greater than 4 L) (commonly contain chemicals such as those listed in WAC 173-303-9903 and -9904 and in 40 CFR 261.33), or commercial products which exhibit one or more of the dangerous waste characteristics or criteria. Greater than 99 percent of the containers generally contain chemicals for which information is easily accessible to determine dangerous designation. This information is generally obtained from the container label, for those waste in original containers, or from the material safety data sheet (MSDS) for the product.

Notification for Storing of Waste: The waste analysis process begins when the waste management organization is notified of the presence of a chemical or mixed waste. This notification is accomplished by the generating unit completing and transmitting an electronic Disposal Request. The form describes the volume and chemical composition of waste in each waste container for disposal. Hazard and compatibility information are obtained for each item on the disposal request form to ensure the safety of the waste management organization staff that collect and transport the waste and to ensure safe and appropriate storage in 305-B Storage Facility.

The compatibility and hazard class are determined using reference material that may include, Condensed Chemical Dictionary, Merck Index, 49 CFR, NIOSH, Sigma-Aldrich or any other reference material that is applicable. The priority of hazard designation for those substances with multiple hazards or for mixtures is the same used by the DOT in 49 CFR 173.2.a.

Disposal Requests and other information used for determining waste designations and compatibility must meet four distinct needs of the dangerous waste manager and sample collector. They must enable each to:

- Identify those wastes which are designated dangerous in accordance with WAC 173-303 and whether those wastes are DW or EHW
- Determine whether the waste is restricted from land disposal under 40 CFR 268 or WAC 173-303-140 and, as whether it, complies with applicable treatment standards under 40 CFR 268 or WAC 173-303-140
- Identify and verify specific morphological characteristics of waste in solid or solution form
- Outline how to safely handle, transport, analyze, store, and dispose of the waste product or sample.

Physical Analysis. Visual validation as a physical analysis activity strongly relied upon to confirm the nature of a waste collected or sampled, and to determine the accuracy of the disposal request information received from the generating unit. It is impractical for the waste management organization to chemically analyze each container or vial of waste accepted for storage in 305-B Storage Facility since the amount can exceed 10,000 per year. A more realistic approach to reducing risks to safety and the environment, and one implemented at 305-B Storage Facility, includes trained and experienced personnel performing a visual inspection of the waste and direct inquiry of the generating unit's personnel. The waste is inspected to verify that it matches the description on the disposal request. If the waste is a discarded product, the contents of the container are inspected to verify that they match the description of the product. For other waste, e.g., spent solvents, waste descriptions are compared with the products in use at the generating unit. Generating unit personnel are queried concerning the source of the waste and the materials used in the process generating the waste. This information is compared to the description of the waste on the disposal request. If, after visual inspection of the waste and interrogation of the generating unit personnel, any doubt remains as to the true identity of the waste, the waste is sampled and analyzed by the generating unit as described in Section 3.5.

Waste Collection at the Generating Unit. When satisfactory information has been obtained from the Disposal Request Form, waste management organization staff visits the generating unit site and make a final inspection of the waste containers to determine whether the disposal request form and contents label information match completely. If the information on the disposal request matches with the container labeling and visual inspection, the waste is approved for storage. If discrepancies are found, the generating unit is required to resubmit the disposal request with accurate information. Unknown or unidentified materials are sampled by generating unit staff for identification of constituents and remain at the generating unit until the composition has been determined.

Labeling and Marking. After inspection of the waste at the generating unit, the approved waste is assigned a unique computer identification number, cell location and hazard classification. Waste meeting Washington dangerous waste criteria under WAC 173-303-090 or 173-303-100 are marked "Toxic" (for waste designated WT01 or WT02), and/or "Persistent" (for waste designated WP01, WP02, or WP03), in accordance with WAC 173-303-630(3). In addition, each waste container is labeled with a list of constituents and major risk(s). This computerized information helps the waste handlers ensure safe handling, storage, retrieval and transportation of dangerous waste.

Transportation. The labeled containers are transported to 305-B Storage Facility by PNNL staff trained in applicable DOT requirements and emergency response. Waste is transported using a truck or light utility vehicle. For transport on roads accessible to the public, the vehicles are placarded in compliance with DOT regulations and documented in compliance with WAC 173-303-180, Hanford Facility Permit Conditions II.P. and/or II.Q as applicable.

Waste Handling, Storage, and Tracking at 305-B Storage Facility. Waste received at 305-B Storage Facility is put into 14 separate hazard classifications based on building and fire code restrictions for that type of facility:

1. Non-flammable mixed waste
2. Oxidizers
3. Acids, (organic and inorganic)
4. Poison
5. Caustics
6. Flammable Solids
7. Non-Regulated
8. Miscellaneous
9. Washington State only waste (e.g., sodium chloride, sodium bicarbonate)
10. Flammable and combustible liquids

11. Flammable and combustible mixed waste
12. Compressed gases and aerosols
13. Special Case waste (organic peroxides, explosives, etc.)
14. Recycle

Each hazard class has designated and clearly identified locations within 305-B Storage Facility. Containers of dangerous wastes (10 gal or less) are stored in a specific storage cabinet or shelf designed for that hazard class. The cabinets are located inside the appropriate storage cell (i.e., acid storage cabinet in acid cell). DOT-approved containers (typically 10 gal and larger but less than 0.46m³) are segregated by hazard class and can be stored in an appropriate storage cell or on the main high bay floor in 305-B Storage Facility.

Only sealed containers of nonflammable mixed waste are received in the below-grade mixed waste storage area located in the basement of 305-B Storage Facility. Containers of flammable mixed waste are stored above grade in a flammable storage module adjacent to the high bay area. All chemical storage is in accordance with fire protection requirements of the 1988 Uniform Fire Code (International Conference of Building Officials 1988).

Storage limits for all chemicals are listed in Table 4-1, (Uniform Building Code Table numbers 9-A and 9-B). This table is incorporated into this section by reference.

Recordkeeping and Inventory Control. A computer tracking system has been developed to ensure that complete records of current inventory, packaging, and shipping data are maintained. Records of the initial waste disposal request, waste analysis results if required, waste designation, and shipping manifests are maintained. As wastes are received for disposal, the containers are labeled with the information described in the Labeling and Marking section above, including a unique computer identification number.

The endpoint of the process for most waste is proper packaging and transport of the waste to an approved recycler or treatment/disposal facility. Some commercial chemical products, however, are redistributed to other Hanford Site contractors. Final computer verification of the history and ultimate disposal of each waste container is entered when the material is shipped from the 305-B Storage Facility.

Current waste quantities in inventory are periodically verified and reported to the Unit Operations Supervisor. The inventory is checked by hazard class and provides a measure of current inventory versus established limits.

If it is determined that 305-B Storage Facility inventory is within 5 percent of the limit for a given hazard classification, additional waste of that hazard class is not accepted into 305-B Storage Facility until the inventory has been reduced. Exceptions must be approved by the unit operating supervisor.

Unknown Waste and Waste Constituent Verification. Containers with unknown waste compositions are not accepted at 305-B Storage Facility. In the event that 305-B Storage Facility staff is required to respond to a critical need of a generating unit in the future and pick up an unknown waste, it will be sampled and analyzed as described in Sections 3.4.

If, for any reason, 305-B Storage Facility personnel believe that more stringent analysis of non-reagent grade chemical waste is needed (i.e., flash cans and mixtures), they will request that the generating unit have the waste analyzed by an approved analytical laboratory. Reasons for this request may be questionable appearance of the waste, periodic confirmation of waste composition, or historically unreliable information from a particular generating unit. There is no established frequency for this sampling and analysis; it is conducted on an as-needed basis. This analysis must be performed in

accordance with EPA SW-846 procedures (EPA 1986). Analytical laboratories in the area with these capabilities include commercial, Hanford Site and Battelle operated laboratories. The generating unit must also provide the laboratory analysis confirming the waste composition when the waste management organization picks up the waste. This analysis will become part of the 305-B Storage Facility Operating Record.

3.2.3 Identification/EPA Classification and Quantities of Hazardous Wastes Managed Within the 305-B Storage Facility

Refer to Section 3.1 for a description of the types and quantities of wastes managed at 305-B Storage Facility.

3.2.4 Description of Hazardous Waste Management Units

The 305-B Storage Facility Waste Management Units are described in Attachment 18, Chapter 4.0.

3.3 SELECTING WASTE ANALYSIS PARAMETERS

State and federal regulations [WAC 173-303-300(2) and (5)(a); WAC 173-303-140; 40 CFR 268.7(a)] require that information be obtained, documented, and/or reported on wastes received by a TSD unit. These requirements include ensuring that only waste which meets 305-B Storage Facility unit-specific permit requirements are accepted, and reporting the information required by WAC 173-303-380. In addition to providing a general description of the waste, the focus of the information collected for regulatory purposes is to ensure that the 305-B Storage Facility is permitted to accept and store the waste.

The 305-B Storage Facility only accepts wastes that have been characterized properly. Before receipt or acceptance of waste at the 305-B Storage Facility, generators must supply adequate information to characterize and manage wastes properly.

One of the most important aspects of operating the 305-B Storage Facility in a safe manner is to ensure that incompatible wastes are not mixed together. For the purposes of this document, waste is considered compatible if, when mixed, waste does not: (1) generate extreme heat or pressure, fire, or explosion, or violent reaction; (2) produce uncontrolled toxic mists, dusts, or gases in sufficient quantities to threaten human health; (3) produce uncontrolled flammable fumes or gases in sufficient quantities to pose a risk of fire or explosions; (4) damage the structural integrity of the device or facility containing the waste; or (5) through other like means threaten human health or the environment.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 305-B Storage Facility. The following are instances where sampling and laboratory analysis is required:

- inadequate information on PNNL-generated waste
- 5 percent waste verification for PNNL-generated waste
- 10 percent waste verification for non-PNNL-generated waste
- identification and characterization for unknown waste and spills within the unit.

3.3.1 Parameter Selection Process

The selection of analytical parameters is based on the State of Washington's "Dangerous Waste Regulations," WAC 173-303-300 and *EPA Waste Analysis at Facilities That Generate, Treat, Store, and Dispose of Hazardous Wastes, A Guidance Manual* (EPA 1994).

At least five percent of the waste containers received at 305-B during a federal fiscal year (October 1 through September 30) will undergo confirmation of designation pursuant to Sections 3.2.2 and 3.2.3. The number of containers needed to meet the five percent requirement is five percent of the average of containers for the previous three months. For example if 200 containers are received in January, 180 in February, and 220 in March, then 10 containers of received waste must undergo confirmation of designation in April. All non-PNNL generating units which ship more than 20 containers through 305-B Storage Facility in a fiscal year will have at least one 1 container sampled and analyzed. Containers, for which there is insufficient process knowledge, or analytical information to designate without sampling and analysis, may not be counted as part of the five percent requirement unless there is additional confirmation of designation independent of the generator designation. The generating unit's staff shall not select the waste containers to be sampled and analyzed other than identifying containers for which insufficient information is available to designate.

Containers of the following are exempt from the confirmation calculation above: Laboratory reagents or other unused products such as paint, lubricants, solvent, or cleaning products, whether received for redistribution, recycling, or as waste. To qualify for this exemption, such materials must be received at 305-B Storage Facility in their original containers.

Prior to acceptance of wastes at 305-B Storage Facility, confirmation of designation may be required (Section 3.7.3). Wastes that shall undergo confirmation of designation are identified in Condition III.2.B.f. of this Permit and may be divided into two groups; those that easily yield a representative sample (Category I), and those that do not (Category II). The steps for each type are outlined below along with a description of which wastes fall into each category:

Category I. If a waste which easily yields a representative sample is received, a representative sample will be taken from the waste containers selected. If more than one phase is present, each phase must be tested individually. The following field tests will be performed as appropriate for the waste stream:

- Reactivity - oxidizer, cyanide, and sulfide tests. These tests will not be performed on materials known to be organic peroxides, ethers, and/or water reactive compounds.
- Flashpoint/explosivity - explosive atmosphere meter¹, or a closed cup flashpoint measurement instrument¹.
- pH - by pH meter¹ or pH paper (SW-846-9041)². This test will not be performed on non- aqueous materials.
- Halogenated organic compounds.
- Volatile organic compounds - by photo or flame ionization tester¹, by gas chromatography with or without mass spectrometry, or by melting point and/or boiling point determination.

If the sample data observed meets the parameters specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, the waste is rejected and returned to the generating unit for additional characterization. The waste will be required to be resubmitted with a revised Disposal Request following the additional characterization activity.

¹ These instruments are field calibrated or checked for accuracy daily when in use.

² The pH paper must have a distinct color change every 0.5 pH units and each batch of paper must be calibrated against certified pH buffers, or by comparison with a pH meter calibrated with certified pH buffers.

When mathematically possible, the Permittees shall perform confirmation on an equal number of Category I and Category II containers.

Category II. If a representative sample is not easily obtained (for example, discarded machinery or shop rags), or if the waste is a labpack or discarded laboratory reagent container, the following steps will be performed:

- a. Visually verify the waste. Examine each selected container to ensure that it matches the data provided on the Disposal Request form(s) provided to document the waste. Labpacks and combination packages that are accepted from non-PNNL generators must be removed from the outer container. If the waste matches the description specified in its documentation, confirmation of designation is complete and the waste may be accepted. If not, the waste is rejected and returned to the generating unit, and the generating unit revises and resubmits the documentation to reflect the actual contents. If necessary, the waste shall be re-designated utilizing the designation methods identified in WAC 173-303-070 through 173-303-100."

3.3.2 Criteria and Rational for Parameter Selection

Waste-testing methods, parameters and the rationale for these parameters are summarized in Table 3-1. Waste testing methods and references to these methods are as specified in WAC 173-303-110(3) or approved by Ecology in accordance with WAC 173-303-110(5). These methods are summarized in Table 3-1. All methods are specified in *Chemical Testing Methods*, WDOE 83-13 (Ecology 1983) and/or *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, EPA SW-846 (EPA 1986).

Testing parameters for each type of waste were selected to obtain data sufficient to designate the waste properly under WAC 173-303-070, meet requirements for Land Disposal Restrictions, and to manage the waste properly. If information on the source of the waste is available, then all parameters might not be required, e.g., exclusion of testing for pesticides from a metal-machining operation.

Some of the parameters that are considered for waste received at the 305-B Storage Facility are as follows.

- Physical description – used to determine the general characteristics of the waste. This facilitates subjective comparison of the sampled waste with previous waste descriptions or samples. Also, a physical description is used to verify the observational presence or absence of free liquids.
- pH – used to identify the pH and corrosive nature of an aqueous or solid waste, to aid in establishing compatibility strategies, and to indicate if the waste is acceptable for treatment and/or storage in the 325 HWTUs.
- Cyanide – used to indicate whether the waste produces hydrogen cyanide upon acidification below pH 2.
- Sulfide screen – used to indicate if the waste produces hydrogen sulfide upon acidification below pH 2.
- Halogenated hydrocarbon content screen – used to indicate whether chlorinated hydrocarbons or polychlorinated biphenyls (PCBs) are present in waste and to determine if the waste needs to be managed in accordance with the regulations prescribed in the *Toxic Substance Control Act of 1976*.
- Ignitability – used to identify waste that must be managed and protected from sources of ignition or open flame.
- Testing kits – used to determine waste characteristics and verify generator knowledge. The testing procedures for each test are included in the appropriate test kit.

3.3.3 Special Parameter Selection Requirements

The 305-B Storage Facility does not have any process vents that manage hazardous waste with organic concentrations of at least 10 part per million by weight percent, or pumps, or compressors used more than 300 hours per year that come into contact with hazardous waste with an organic concentration of at least 10 percent by weight.

A variety of small volume chemical wastes are generated by PNNL's research laboratory activities. These containers typically range in sizes from 10 ml to 20 gallon. These wastes are brought to the 305-B Storage Facility and segregated by compatibility for storage in the unit until enough waste is accumulated to fill a labpack or bulking container, usually a 30- to 55-gallon drum. All containers having a design capacity greater than 0.1 m³ to less than or equal to 0.46 m³ are equipped with a cover and complies with all applicable Department of Transportation regulations on packaging hazardous waste for transport under 49 CFR part 178.

DOT approved intermediate bulk packaging may be utilized for some solid wastes. These containers range in size from 0.1 cu yard (27 cu ft) to 1.6 cu yard (43 cu ft) and are approved for solid waste only.

3.4 SELECTING SAMPLING PROCEDURES

3.4.1 Sampling Strategies and Equipment

Sample collection methods conform to the representative sample methods referenced in WAC 173-303-110(2). The summary of test parameters, rationales and sampling methods are identified in Table 3-1.

Representative samples of liquid waste from containers (vertical 'core sections') are typically obtained using a composite liquid waste sampler (COLIWASA) or tubing, as appropriate. The sampler is long enough to reach the bottom of the container in order to provide a representative sample of all phases of the containerized liquid waste. If a liquid waste has more than one phase, each phase is separated for individual testing depending on the waste management pathways of the phases.

Other waste types that might require sampling are sludge's, powders, and granules. In general, non-viscous sludge's are sampled using a COLIWASA. Highly viscous sludge's and cohesive solids are sampled using a trier, as specified in SW-846. Dry powders and granules are sampled using a thief, also as specified in SW-846.

Samplers are constructed of material compatible with the waste. In general, aqueous liquids are sampled using polyethylene samplers, organic liquids using glass samplers, and solids using polyethylene samplers. Disposable samplers are used whenever possible to eliminate the potential for cross-contamination. If non-disposable sampling equipment is used, it is decontaminated between samples.

Representative sampling may be requested by unit staff to ensure proper waste identification. Sampling may be performed by unit personnel or the generating unit producing the waste. The number of grab samples collected from a container depends on the amount of waste present and on the homogeneity of the waste as determined by observation. In some cases, there will be only one container of waste present. In such cases, only one vertical composite sample will be collected (e.g., COLIWASA). If more than one container is present, a random number of samples will be collected and analyzed statistically using the procedures specified in Section 9.2 of SW-846 (EPA 1986).

In all instances, sampling methods will conform to the representative sample method referenced in WAC 173-303-110(2), i.e., ASTM standards for solids and SW-846 for liquids. The specific sampling methods and equipment used varies with the chemical and physical nature of the waste material and the sampling circumstances.

3.4.2 Sampling Preservation and Storage

All sample containers, preservation techniques, and hold times follow SW-846 protocol. Many samples are analyzed at the 305-B Storage Facility utilizing prepackaged test kits and are not preserved.

3.4.3 Sampling QA/QC Procedures

Pacific Northwest National Laboratory is committed to maintaining a high standard of quality for all of its activities. A crucial element in maintaining that standard is a quality-assurance program that provides management controls for conducting activities in a planned and controlled manner and enabling the verification of those activities.

The QA/QC objective of the 305-B Storage Facility is to control and characterize errors associated with collected data, and to illustrate that waste testing has been performed according to specification in this waste analysis plan.

The 305-B Storage Facility will ensure that precision and accuracy are maintained throughout the waste analysis process. For analysis using SW-846 methods, the program will follow the QA/QC guidance set forth in SW-846 at a minimum. Good laboratory practices which encompasses sampling, sampling handling, housekeeping, and safety are followed throughout the process. There are many elements of QA/QC associated with the sampling processes at the 305-B Storage Facility. These practices ensure that all data and the decisions based on that data are technically sound, statistically valid, and properly documented.

Activities pertaining to waste analysis include, but are not limited to, the preparation, review, and control of procedures and the selection of analytical laboratories. The Laboratory's QA SBMS subject area has administrative procedures that establish requirements and provide guidance for the preparation of analytical and technical (i.e., sampling, chain-of-custody, work processes) procedures, as well as other administrative procedures. Procedures undergo a review cycle and, once issued, are controlled to ensure that only current copies are used.

The primary purpose of waste testing is to ensure that the waste is properly characterized in lieu of process-knowledge data, in compliance with RCRA requirements for general waste analysis [WAC 173-303-300(2); 40 CFR 264.13]. Waste testing also is performed to ensure the safe management of waste being stored, proper disposition of residuals from incidents that might occur, and control of the acceptance of waste for storage. The specific objectives of the waste-sampling and analysis program at the 305-B Storage Facility are as follows:

- Identify the presence of waste that is substantially different from waste currently stored.
- Provide a detailed chemical and physical analysis of a representative sample of the waste, before the waste is accepted at or transferred from the 305-B Storage Facility to an offsite TSD facility, to ensure proper management and disposal.
- Provide an analysis that is accurate and up-to-date to ensure that waste is properly treated and disposed of.
- Ensure safe management of waste undergoing storage at the 305-B Storage Facility.

- 1 • Ensure proper disposal of residuals.
- 2 • Ensure compliance with LDR's.
- 3 • Identify and reject waste that does not meet the 305-B Storage Facility's acceptance requirements
- 4 (e.g., incomplete information).
- 5 • Identify and reject waste that does not meet specifications for the 305-B Storage Facility (i.e., Part A,
- 6 Form 3, listing, restricted from storage at the 305-B Storage Facility).

7 **QA/QC Objectives**

8 The objectives of the QA/QC program are two-fold. The first objective is to control and characterize any
9 errors associated with the collected data. Quality-assurance activities, such as the use of standard
10 methods for locating and collecting samples, are intended to limit the introduction of error. Quality-
11 control activities, such as the collection of duplicate samples and the inclusion of blanks in sample sets,
12 are intended to provide the information required to characterize any errors in the data. Other QC
13 activities, such as planning the QC program and auditing ongoing and completed activities, ensure that
14 the specified methods are followed and that the QA information needed for characterizing error is
15 obtained.

16 The second QA/QC objective is to illustrate that waste testing has been performed according to
17 specification in this waste-analysis plan. The QA/QC activities will include the following:

- 18 • Field inspections – performed and documented by 305-B Storage Facility staff or designee,
19 depending on the activity. The inspections primarily are visual examinations but might include
20 measurements of materials and equipment used, techniques employed, and the final products. The
21 purpose of these inspections is to verify that a specific guideline, specification, or procedure for the
22 activity is completed successfully.
- 23 • Field testing – performed onsite by 305-B Storage Facility staff (or designee) according to specified
24 procedures.
- 25 • Laboratory analyses – performed by onsite or offsite laboratories on samples of waste. The purpose
26 of the laboratory analyses is to determine constituents or characteristics present and the concentration
27 or level.

28 **Sampling Objectives**

29 The data-quality objectives (DQO) for the waste sampling and data analyses are as follows:

- 30 • Determine if waste samples are representative of the contents of the containers at the time the samples
31 were taken.
- 32 • Determine if waste samples are representative of long-term operations affecting the 305-B Storage
33 Facility.
- 34 • Determine if waste accepted for storage is within the RCRA permit documentation limitations.
- 35 • Determine if waste accepted for storage meets the requirements of the 305-B Storage Facility waste-
36 acceptance criteria.
- 37 • Determine if waste accepted for storage meets the information provided by the generator.

38 **Data Collection/Sampling Objectives**

39 The acquired data need to be scientifically sound, of known quality, and thoroughly documented. The
40 DQOs for the data assessment will be used to determine compliance with national quality standards,
41 which are as follows:

- Precision – The precision will be the agreement between the collected samples (duplicates) for the same parameters, at the same location, and from the same collection vessel.
- Representativeness – The representativeness will address the degree to which the data accurately and precisely represent a real characterization of the population, parameter variation at a sampling point, sampling conditions, and the environmental condition at the time of sampling. The issue of representativeness will be addressed for the following points:
 - Based on the generating process, the waste stream, and its volume, an adequate number of sampling locations are selected

The representativeness of selected media has been defined accurately

- The sampling and analytical methodologies are appropriate.
- The environmental conditions at the time of sampling are documented.
- Completeness – The completeness will be defined as the capability of the sampling and analytical methodologies to measure the contaminants present in the waste accurately.
- Comparability – The comparability of the data generated will be defined as the data that are gathered using standardized sampling methods, standardized analyses methods, and quality-controlled data-reduction and validation methods.

Analytical Objectives

Analytical data will be communicated clearly and documented to verify that laboratory data-quality objects are achieved.

Field Quality Assurance and Quality Control

Internal QA/QC checks will be established by submitting QA and QC samples to the analytical laboratory. The number of field QA samples will be approximately 5 percent of the total number of field samples taken. The 5 percent criterion commonly is accepted for a minimum number of QA/QC samples. The types and frequency of collection for field QA samples are as follows:

- Field Blanks – A sample of analyte-free media taken from the laboratory to the sampling site and returned to the laboratory unopened. Field blanks are prepared and preserved using sample containers from the same lot as the other samples collected that day. A sample blank is used to document contamination attributable to shipping and field-handling procedures. This type of blank is useful in documenting contamination of volatile organics samples.
- Field Duplicates – defined as independent samples collected in such a manner that the samples are equally representative of the variables of interest at a given point in space and time. The laboratory will use the field duplicate as laboratory duplicate and/or matrix spikes. Thus, for the duplicate sample, there will be the normal sample analysis, the field duplicate, and the laboratory duplicates (inorganic analysis). Duplicate samples will provide an estimate of sampling precision.

Laboratory Quality Assurance and Quality Control

All analytical work, whether performed by independent laboratories, is defined and controlled by a Statement of Work, prepared in accordance with administrative procedures. The daily quality of analytical data generated in the analytical laboratories will be controlled by the implementation of an analytical laboratory QA plan. At a minimum, the plan will document the following:

- sample custody and management practices
- requirements for sample preparation and analytical procedures
- instrument maintenance and calibration requirements

- internal QA/QC measures, including the use of method blanks
- required sample preservation protocols
- analysis capabilities.

The types of internal quality-control checks are as follows:

- **Method Blanks** – Method blanks usually consist of laboratory reagent-grade water treated in the same manner as the sample (i.e., digested, extracted, distilled) that is analyzed and reported as a standard sample would be reported.
- **Method Blank Spike** – A method blank spike is a sample of laboratory reagent-grade water fortified (spiked) with the analytes of interest, which is prepared and analyzed with the associated sample batch.
- **Laboratory Control Sample** – A QC sample introduced into a process to monitor the performance of the system.
- **Matrix Spikes** – An aliquot of sample spiked with a known concentration of target analyte(s). The spiking occurs prior to sample preparation and analysis. Matrix spikes will be performed on 5 percent of the samples (1 in 20) or one per batch of samples.
- **Laboratory Duplicate Samples** – Duplicate samples are obtained by splitting a field sample into two separate aliquots and performing two separate analyses on the aliquots. The analyses of laboratory duplicates monitor the precision of the analytical method for the sample matrix; however, the analyses might be affected by nonhomogeneity of the sample, in particular, by nonaqueous samples. Duplicates are performed only in association with selected protocols. Duplicates are performed only in association with selected protocols. Laboratory duplicates are performed on 5 percent of the samples (1 in 20) or one per batch of samples. If the precision value exceeds the control limit, then the sample set must be reanalyzed for the parameter in question.
- **Known QC Check Sample** – This is a reference QC sample as denoted by SW-846 of known concentration, obtained from the EPA, the National Institute of Standards and Technology, or an EPA-approved commercial source. This QC sample is taken to check the accuracy of an analytical procedure. The QC sample is particularly applicable when a minor revision or adjustment has been made to an analytical procedure or instrument. The results of a QC-check- standard analysis are compared with the true values, and the percent recovery of the check standard is calculated.

PNNL Analytical Chemistry Laboratory QA/QC

PNNL's analytical chemistry laboratory may need to be used to analyze samples of high-activity dangerous waste. It has a rigorous QA plan that ensures that data produced are defensible, scientifically valid, and of known precision and accuracy, and meets the requirements of its clients.

Offsite Laboratory QA/QC

When it is necessary to send samples to an independent laboratory, contracts are not awarded until a pre-award evaluation of the prospective laboratory has been performed. The pre-award evaluation process involves the submittal of its QA plan to PNNL QA staff and the unit-operating supervisor. It also may involve a site visit by QA personnel and a technical expert, or may consist of a review of the prospective laboratories' QA/QC documents and records of surveillances/inspections, audits, non-conformances, and corrective actions maintained by PNNL or other Hanford Facility contractors.

Recordkeeping

Records associated with the waste-analysis plan and waste-verification program are maintained by the waste-management organization. A copy of the Disposal Request for each waste stream accepted at the 305-B Storage Facility is maintained as part of the operating record. Generators maintain their sampling and analysis records. The waste-analysis plan will be revised whenever regulation changes affect the waste-analysis plan.

Staff of the 305-B Storage Facility has a goal of continuous improvement by ensuring that all analytical data produced is of known accuracy and precision, exceeds all industry standards and is scientifically valid. Using the above practices and following the appropriate 305-B Storage Facility operating procedures staff can monitor and ensure that progress is being made in the quality of the data produced.

3.4.4 Health and Safety Protocols

During all sampling activities, precautions will be taken to ensure that waste containers do not expel gases and/or pressurized liquids. All personnel will be properly trained in safety and handling techniques.

3.5 SELECTING A LABORATORY, AND LABORATORY TESTING AND ANALYTICAL METHODS

3.5.1 Selecting a Laboratory

Laboratory selection is limited; only a few laboratories are equipped to handle mixed waste because of special equipment and procedures that must be used to minimize personnel exposure. Preference will be given to any PNNL facility or other laboratories on the Hanford Facility that exhibit demonstrated experience and capabilities in three major areas:

- comprehensive written QA/QC program based on DOE-RL requirements specifically for that laboratory
- audited for effective implementation of QA/QC program
- participate in performance-evaluation samples to demonstrate analytical proficiency.

All laboratories (onsite or offsite) are required to have the following QA/QC documentation:

- Daily analytical data generated in the contracted analytical laboratories is controlled by the implementation of an analytical laboratory QA plan.
- Before commencement of the contract for analytical work, the laboratory will, have their QA plan available for review. At a minimum, the QA plan will document the following:
 - sample custody and management practices
 - requirements for sample preparation and analytical procedures
 - instrument maintenance and calibration requirements
 - internal QA/QC measures, including the use of method blanks
 - required sample preservation protocols
 - analysis capabilities.

3.5.2 Selecting Testing and Analytical Methods

PNNL waste generators may need to conduct analyses to provide information to fill out a Disposal Request form, and to determine compatibility, safety, and operating information. As needed, 305-B Storage Facility staff also will conduct analyses to determine completeness of information and if the waste meets the acceptance criteria for disposal, treatment or storage at one of the Hanford Facility-permitted treatment/storage/disposal areas or that of one of the offsite TSD facilities. Testing and analytical methods will depend on the type of analysis sought and the reason for needing the information.

Chemists and/or appropriate personnel working under approved QA guidelines perform all testing. Analytical methods will be selected from those that are described in Section 3.3.1.

3.6 SELECTING WASTE RE-EVALUATION FREQUENCIES

Some analysis will be needed to verify that waste streams received by the 305-B Storage Facility conform to the information on the Disposal Request and or the waste analysis sheet supplied by the generator. If discrepancies are found between information on the Disposal Request, hazardous-waste manifest, shipping papers, waste- analysis documentation and verification analysis, then the discrepancy will be resolved by:

- returning waste to the generator, or sample and analyze the materials in accordance with WAC 173-303-110; and/or
- reassessing and re-designating the waste; repackaging and labeling as necessary or return to the generator.

Periodic re-evaluation provides verification that the results from the initial verification are still valid. Periodic re-evaluation also checks for changes in the waste stream.

Exceptions to physical screening for verification are:

Analysis and characterization, as required by WAC 173-303-300(2), are performed on each waste before acceptance at the 305-B Storage Facility to determine waste designation and characteristics. The characterization of the waste, based on this information, is reviewed each time a waste is accepted. The information must be updated by the generator when the waste stream changes or if the following occurs.

- The 305-B Storage Facility personnel have reason to suspect a change in the waste, based on inconsistencies in packaging, labeling or visual inspection of the waste.
- The information submitted previously does not match the characteristics of the waste submitted.

Sampling and laboratory analysis could be required to verify or establish waste characteristics for waste that is stored at the 305-B Storage Facility. The following are instances where sampling and laboratory analysis are required:

- inadequate information on PNNL-generated waste
- waste streams generated onsite will be verified at 5 percent of each waste stream
- inadequate information before waste was shipped or discrepancy discovered
- waste streams received from offsite generators will be verified at 10 percent of each waste stream applied per generator, per shipment
- identification and characterization for unknown waste and spills.

3.7 SPECIAL PROCEDURAL REQUIREMENTS

3.7.1 Procedures for Receiving Waste From off-site Generators

Most of the waste stored at 305-B Storage Facility is generated on the Hanford Site and/or by PNNL research programs within the 300 Area. Additional requirements for waste generated outside the 300 Area include proper manifesting (if appropriate) to 305-B Storage Facility and proper packaging for transport over public roadways. Although PNNL waste generated outside of the 300 Area is considered to be generated offsite since it may be transported to 305-B Storage Facility on roads accessible to the public, it is under the same administrative controls as wastes that are generated onsite (i.e., in the 300 Area).

The generator is responsible for identifying waste composition accurately and PNNL waste operations will arrange for the transport of the waste. The 305-B Storage Facility maintains a copy of any pertinent operating record in accordance with WAC 173-303 and the time frames described in Attachment 33, General Information Portion, Chapter 12 (DOE/RL-91-28). The waste-tracking methods are as follows.

- **Inspection of Shipping Papers/Documentation** – The necessary shipment papers for the entire shipment are verified (i.e., signatures are dated, all waste containers included in the shipment are accounted for and correctly indicated on the shipment documentation, there is consistency throughout the different shipment documentation, and the documentation matches the labels on the containers).
- **Inspection of Waste Containers** – The condition of waste containers is checked to verify that the containers are in good condition (i.e., free of holes and punctures).
- **Inspection of Container Labeling** – Shipment documentation is used to verify that the containers are labeled with the appropriate "Hazardous/Dangerous Waste" labeling and associated markings according to the contents of the waste container.
- **Acceptance of Waste Containers** – The 305-B Storage Facility personnel sign the Shipment documents and retain a copy.

If Shipment will be received from or destined offsite, then a Uniform Hazardous Waste Manifest will be prepared identifying the 305-B Storage Facility as the receiving unit (Hanford Facility Permit, Condition II.P. The 305-B Storage Facility operations staff will sign and date the manifest to certify that the dangerous waste covered by the manifest was received. The transporter will be given at least one copy of the signed manifest. A copy of the manifest will be returned to the generator within 30 days of receipt at the 305-B Storage Facility. A copy of the manifest also will be retained in the 305-B Storage Facility operating record.

For onsite waste transfers subject to Hanford RCRA Permit, Dangerous Waste Portion, Condition II.Q.1, documentation meeting that requirement will be prepared and accompany the shipment. The documentation will be maintained in the Operating Record.

Response to Significant Discrepancies

The primary concern during acceptance of containers for storage is improper packaging or manifest discrepancies. Containers with such discrepancies are not accepted at the 305-B Storage Facility until the discrepancy has been resolved. Depending on the nature of the condition, such discrepancies can be resolved through the use of one or more of the following alternatives.

- Incorrect or incomplete entries on the Uniform Hazardous Waste Manifest can be corrected or completed with concurrence of the onsite generator or offsite generator. Corrections are made by

drawing a single line through the incorrect entry. Corrected entries are initialed and dated by the individual making the correction.

- The waste packages can be held and the onsite generator or offsite waste generator requested to provide written instructions for use in correcting the condition before the waste is accepted.
- Waste packages can be returned as unacceptable.
- If a noncompliant dangerous waste package is received from an offsite waste generator, and the waste package is non-returnable because of condition, packaging, etc., and if an agreement cannot be reached among the involved parties to resolve the noncompliant condition, then the issue will be referred to DOE-RL and Ecology for resolution. Ecology will be notified in writing if a discrepancy is not resolved within 15 days after receiving a noncompliant shipment. Pending resolution, such waste packages, although not accepted, might be placed in the 305-B Storage Facility. The package(s) will be segregated from other waste and an entry will be made into the 305-B Storage Facility logbook describing the actions that were taken to store the packages in a safe manor until a resolution has been reached.

Activation of Contingency Plan for Damaged Shipment

If waste shipments arrive at the 305-B Storage Facility in a condition that presents a hazard to public health or the environment, the Building Emergency Procedure is implemented as described in the Hanford Facility RCRA Permit, Attachment 18, Chapter 7.0 for the 305-B Storage Facility.

3.7.2 Procedures for Ignitable, Reactive, and Incompatible Wastes

Ignitable, reactive and incompatible wastes are stored in compliance with Uniform Fire Code Division II regulations for Container and Portable Tank Storage Inside Buildings (International Conference of Building Officials 1988). Containers of ignitable, reactive and incompatible wastes are stored in individual flammable material storage cabinets within the storage cells.

Section 6.5.2 describes procedures used at 305-B Storage Facility to determine the compatibility of dangerous wastes so that incompatible wastes are not stored together. Chemical wastes stored in 305-B Storage Facility are separated by chemical makeup and hazard class and stored in areas having appropriate secondary containment, as described in Section 4.1.1.6.

As shown in Figures 4-1 through 4-10, each storage area has individual storage configurations; secondary containment structures are provided to assure that incompatible materials will not commingle if spilled. Further segregation is provided by chemical storage cabinets located throughout the facility in various areas as shown in Figures 4-1 through 4-10. Cabinet types are noted in those figures and capacities described in Table 4-2. Incompatible wastes are never placed in the same container, or in unwashed containers that previously held incompatible waste.

Compliance with WAC 173-303-395(1)(b) is assured by utilizing this system, and the procedure for handling ignitable or reactive waste and mixing of incompatible waste, as described in Section 6.5.2.

3.7.3 Procedures To Ensure Compliance With LDR Requirements

LDR Waste-Analysis Requirements

The *Hazardous and Solid Waste Amendments of 1984* prohibit the land disposal of certain types of wastes that are subject to RCRA. Most of the waste types stored at the 305-B Storage Facility falls within the purview of these land-disposal restrictions (LDRs). Information presented below describes how

generators and 305-B Storage Facility personnel characterize, document, and certify waste subject to LDR requirements.

Waste must be analyzed using the Toxicity Characteristic Leaching Procedure (TCLP) in accordance with Appendix II of 40 CFR 261, as amended, in order to provide sufficient information for proper management and for decisions regarding LDR pursuant to 40 CFR 268.

Waste Characterization

Before being received at the 305-B Storage Facility, the RCRA waste characteristics, the level of toxicity characteristics, and the presence of listed wastes are determined during the physical and chemical analyses process. This information allows waste-management personnel to make all LDR determinations accurately and complete appropriate notifications and certifications.

Sampling and Analytical Procedures

The LDR characterization and analysis is generally performed as part of the waste-characterization and analysis process. If waste is sampled and analyzed for LDR characterization, then only EPA or equivalent methods are used to provide sufficient information for proper management and for decisions regarding LDRs pursuant to 40 CFR 268.

Frequency of Analysis

Before acceptance and during the waste-characterization and analysis process, all LDR characterizations and designations are made. The characterization and analysis process is performed when a Disposal Request is submitted for waste pick-up, unless there is insufficient data or if the waste stream has changed. Instances where sampling and laboratory analysis may be required to determine accurate LDR determinations include the following:

- when waste-management personnel have reason to suspect a change in the waste based on inconsistencies on the Disposal Request, packaging, or labeling of the waste
- when the information submitted previously by a generator does not match the characteristics of the waste that was submitted
- when the offsite TSD facility rejects the waste because the fingerprint samples are inconsistent with the waste profile provided by the 305-B Storage Facility that was established using generator information.

Dangerous waste types listed in Table 3-1 are sampled as needed on an individual container or batch basis before they are collected from the point of generation or prior to shipment offsite. After the dangerous constituents have been characterized, these waste streams will not be analyzed again until process or raw material changes occur.

Documentation and Certification

The 305-B Storage Facility has and will continue to receive and store LDR waste. Because 305-B Storage Facility personnel determine designations and characterization, including LDR determinations, all notifications and certifications, as required by 40 CFR 268, are prepared by qualified staff for PNNL-generated waste. The 305-B Storage Facility staff collects from the generator(s) the information pursuant to 40 CFR 268 regarding LDR waste. The notifications and certifications are submitted to onsite

and offsite TSD units during the waste-shipment process. Additionally, any necessary LDR variances are prepared and submitted by PNNL qualified staff.

The 305-B Storage Facility staff requires applicable LDR information/notifications from non-PNNL generators.

Where an LDR waste does not meet the applicable treatment standards set forth in 40 CFR 268, Subpart D, or exceeds the prohibition levels set forth in 40 CFR 268.32 or Section 3004(d) of RCRA, the 305-B Storage Facility provides to the onsite and offsite TSD a written notice that includes the following information:

- EPA hazardous-waste number
- the corresponding treatment standards and all applicable prohibitions set forth in WAC 173-303, 40 CFR 268.32, or RCRA Section 3004(d)
- the manifest number associated with the waste
- all available waste-characterization data.
- identification of underlying hazardous constituents.

In instances where 305-B Storage Facility staff determines that a restricted waste is being managed that can be land-disposed without further treatment, 305-B Storage Facility staff submits a written notice and certification to the onsite or offsite TSD where the waste is being shipped, stating that the waste meets applicable treatment standards set forth in WAC 173-303-140 (40 CFR 268, Subpart D), and the applicable prohibition levels set forth in 40 CFR 268.32 or RCRA Section 3004(d). The notice includes the following information:

- EPA hazardous-waste number
- corresponding treatment standards and applicable prohibitions
- waste-tracking number associated with the waste
- all available waste-characterization data
- identification of underlying hazardous constituents.

The certification accompanying any of the previously described notices is signed by an authorized representative of the generator and states the following:

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification that the waste complies with the treatment standards specified in 40 CFR Part 268 Subpart D and all applicable prohibitions set forth in 40 CFR 268.32 or RCRA Section 3004(d). I believe that the information I submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting a false certification, including the possibility of a fine and imprisonment.

Copies of all notices and certifications described are retained at the TSD unit for at least five years from the date that the waste was last sent to an onsite or offsite TSD unit. After that time, the notices and certifications are sent to Records Storage.

Table 3-1. Summary of Test Parameters, Rationales, and Methods

Parameter ^a	Method ^b	Rationale for Selection
Physical Screening		
Visual inspection	Field method - observe phases, presence of solids in waste	Confirm that waste matches that described on waste acceptance documentation; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Chemical Screening		
Water miscibility/separable organics ^c	Water mix screen ASTM Method D5232-92	Confirm that waste matches that described on waste acceptance documentation; identify separable organics; identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria
Oxidizer	Oxidizer Screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
pH	pH screen SW-846 Method 9041	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Cyanides	Cyanide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Sulfides	Sulfide screen	Confirm that waste matches that described on waste acceptance documentation; ensure compliance with WAC 173-303-395(1)(b)
Flashpoint	Flashpoint measurement instrument	Confirm that waste matches that described on waste acceptance documentation
Halogenated/Volatile Organic Compounds	Photoionizer or Flame Ionizer, or Clor-D-Tect © Kits	Confirm that waste matches that described on waste acceptance documentation
Pre-Shipment Review		
Mercury (total)	Generator knowledge or SW-846 Method 7470/7471	Identify waste prohibited by LDR requirements related to downstream TSD unit acceptance criteria.
Toxicity characteristic organic compounds	Generator knowledge or SW-846 Methods 1311 and 8260 (volatile organic compounds) and 8270 (semivolatile organic compounds)	Identify waste not identified on the Part A, Form 3
Polycyclic aromatic hydrocarbons	Generator knowledge or SW-846 Method 8270 or 8100	Identify waste not identified on the Part A, Form 3 (for waste with >1% solids and for which WP03 could apply)

^a Addition parameters can be used on current waste acceptance criteria of the downstream TSD unit. Operation limits transfer/shipments are based on current waste acceptance criteria.

^b Procedures based on EPA SW-846, unless otherwise noted. When regulations require a specific method, the method shall be followed.

^c These test will not be performed on materials known to be organic peroxides, ether, and/or water reactive compounds.

CONTENTS

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TABLES

Table 8-1.	305-B Storage Facility Training Matrix.....	Att 18.8-4
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8.0 PERSONNEL TRAINING [H]

This chapter discusses personnel training requirements based on WAC 173-303 and the HF RCRA Permit (DW Portion). In accordance with WAC 173-303-806(4)(a)(xii), the *Hanford Facility Dangerous Waste Part B Permit Application* must contain two items: (1) "an outline of both the introductory and continuing training programs by owners or operators to prepare persons to operate or maintain the TSD facility in a safe manner as required to demonstrate compliance with WAC 173-303-330" and (2) "a brief description of how training will be designed to meet actual job tasks in accordance with the requirements in WAC 173-303-330(1)(d)." The HF RCRA Permit, (DW portion) Condition II.C (Personnel Training) contains training requirements applicable to Hanford Facility personnel and non-Facility personnel.

Compliance with these requirements at the 305-B Storage Facility is demonstrated by information contained both in Attachment 33, General Information Portion, Chapter 8.0 (DOE/RL-91-28) of the HF RCRA Permit, and this chapter. This chapter supplements Attachment 33, General Information Portion, Chapter 8.0 (DOE/RL-91-28).

8.1 OUTLINE OF INTRODUCTORY AND CONTINUING TRAINING PROGRAMS

The introductory and continuing training programs are designed to prepare personnel to manage and maintain the TSD unit in a safe, effective, and environmentally sound manner. In addition to preparing personnel to manage and maintain TSD units under normal conditions, the training programs ensure that personnel are prepared to respond in a prompt and effective manner should abnormal or emergency conditions occur. Emergency response training is consistent with the description of actions contained in Attachment 18, Chapter 7.0, Building Emergency Procedure. The introductory and continuing training programs contain the following objectives:

- Teach Hanford Facility personnel to perform their duties in a way that ensures the Hanford Facility's compliance with WAC 173-303
- Teach Hanford Facility personnel dangerous waste management procedures (including implementation of the contingency plan) relevant to the job titles/positions in which they are employed, and
- Ensure Hanford Facility personnel can respond effectively to emergencies.

8.1.1 Introductory Training

Introductory training includes general Hanford Facility training and TSD unit-specific training. General Hanford Facility training is described in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28) and is provided in accordance with the HF RCRA Permit (DW Portion), Condition II.C.2. TSD unit-specific training is provided to Hanford Facility personnel allowing those personnel to work unescorted, and in some cases is required for escorted access. Hanford Facility personnel cannot perform a task for which they are not properly trained, except to gain required experience while under the direct supervision of a supervisor or coworker who is properly trained. Hanford Facility personnel must be trained within 6 months after their employment at or assignment to the Hanford Facility, or to a new job title/position at the Hanford Facility, whichever is later.

General Hanford Facility training: Refer to description in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28).

Contingency Plan training: Hanford Facility personnel receive training on applicable portions of Attachment 4, *Hanford Emergency Management Plan* (DOE/RL-94-02) in general Hanford Facility training. In addition, Hanford Facility personnel receive training on content of the description of actions

contained in contingency plan documentation in Attachment 18, Chapter 7.0 to be able to effectively respond to emergencies.

Emergency Coordinator training: Hanford Facility personnel who perform emergency coordinator duties in WAC 173-303-360 (e.g., Building Emergency Director) in the Hanford Incident Command System receive training on implementation of the contingency plan and fulfilling the position within the Hanford Incident Command System. These Hanford Facility personnel must also become thoroughly familiar with applicable contingency plan documentation, operations, activities, location, and properties of all waste handled, location of all records, and the unit/building layout.

Operations training: Dangerous waste management operations training (e.g., waste designation training, shippers training) will be determined on a unit-by-unit basis and shall consider the type of waste management unit (e.g., container management unit) and the type of activities performed at the waste management unit (e.g., sampling). For example, training provided for management of dangerous waste in containers will be different than the training provided for management of dangerous waste in a tank system. Common training required for compliance within similar waste management units can be provided in general training and supplemented at the TSD unit. Training provided for TSD unit-specific operations will be identified in the training plan documentation based on: (1) whether a general training course exists, (2) the training needs to ensure waste management unit compliance with WAC 173-303, and (3) training commitments agreed to with Ecology.

8.1.2 Continuing Training

Continuing training meets the requirements for WAC 173-303-330(1)(b) and includes general Hanford Facility training and TSD unit-specific training.

General Hanford Facility training: Annual refresher training is provided for general Hanford Facility training. Refer to description in Attachment 33, General Information Portion, Section 8.1 (DOE/RL-91-28).

Contingency plan training: Annual refresher training is provided for contingency plan training. Refer to description above in Section 8.1.1.

Emergency coordinator training: Annual refresher training is provided for emergency coordinator training. Refer to description above in Section 8.1.1.

Operations training: Refresher training occurs on many frequencies (i.e., annual, every other year, every 3 years) for operations training. When justified, some training will not contain a refresher course and will be identified as a one-time only training course. The TSD unit-specific training plan documentation will specify the frequency for each training course. Refer to description above in Section 8.1.1.

8.2 DESCRIPTION OF TRAINING DESIGN

Proper design of a training program ensures personnel who perform duties on the Hanford Facility related to WAC 173-303-330(1)(d) are trained to perform their duties in compliance with WAC 173-303. Actual job tasks, referred to as duties, are used to determine training requirements. The first step taken to ensure Hanford Facility personnel have received the proper training is to determine and document the waste management duties by job title/position. The second step compares waste management duties to general waste management unit training curriculum. If general waste management unit training curriculum does not address the waste management duties, the training curriculum is supplemented and/or on-the-job training is provided. The third step summarizes the content of a training course necessary to ensure that the training provided to each job title/position addresses associated waste management duties. The last step is to assign training curriculum to Hanford Facility personnel based on the previous evaluation. The training plan documentation contains this process.

Waste management duties include those specified in Section 8.1 as well as those contained in WAC 173-303-330(1)(d). Training elements of WAC 173-303-330(1)(d) applicable to the 305-B Storage Facility operations include the following:

- Procedures for using, inspecting, repairing, and replacing emergency and monitoring equipment
- Communications or alarm systems
- Response to fires or explosions
- Shutdown of operations.

Hanford Facility personnel who perform these duties receive training pertaining to their duties. The training plan documentation described in Section 8.3 contains specific information regarding the types of training Hanford Facility personnel receive based on the outline in Section 8.1.

8.3 DESCRIPTION OF TRAINING PLAN

In accordance with HF RCRA Permit (DW Portion), Condition II.C.3, the unit-specific portion of the *Hanford Facility Dangerous Waste Permit Application* must contain a description of the training plan. Training plan documentation is maintained outside of the *Hanford Facility Dangerous Waste Part B Permit Application* and the HF RCRA Permit. Therefore, changes made to the training plan documentation are not subject to the HF RCRA Permit modification process. However, the training plan documentation is prepared to comply with WAC 173-303-330(2).

Documentation prepared to meet the training plan consists of hard copy and/or electronic media as provided by HF RCRA Permit (DW Portion), Condition II.C.1. The training plan documentation consists of one or more documents and/or a training database with all the components identified in the core document.

A description of how training plan documentation meets the three items in WAC 173-303-330(2) is as follows:

1. -330(2)(a): "The job title, job description, and name of the employee filling each job. The job description must include requisite skills, education, other qualifications, and duties for each position."

Description: The specific Hanford Facility personnel job title/position is correlated to the waste management duties. Waste management duties relating to WAC 173-303 are correlated to training courses to ensure training is properly assigned.

Only names of Hanford Facility personnel who carry out job duties relating to TSD unit waste management operations at the 305-B Storage Facility are maintained. Names are maintained within the training plan documentation. A list of Hanford Facility personnel assigned to the 305-B Storage Facility is available upon request.

Information on requisite skills, education, and other qualifications for job title/positions are addressed by providing a reference where this information is maintained (e.g., human resources). Specific information concerning job title, requisite skills, education, and other qualifications for personnel can be provided upon request.

2. -330(2)(b): "A written description of the type and amount of both introductory and continuing training required for each position."

Description: In addition to the outline provided in Section 8.1, training courses developed to comply with the introductory and continuing training programs are identified and described in the training plan documentation. The type and amount of training is specified in the training plan documentation as shown in Table 8-1.

3. -330(2)(c): "Records documenting that personnel have received and completed the training required by this section. The Department may require, on a case-by-case basis, that training records include employee initials or signature to verify that training was received."

Description: Training records are maintained consistent with Attachment 33, General Information Portion, Section 8.4 (DOE/RL-91-28).

Table 8-1. 305-B Storage Facility Training Matrix

	Training Category*				
Attachment 33, General Information Portion, Chapter 8.0 Training (DOE/RL-91-28) Category	General Hanford Facility Training	Contingency Plan Training	Emergency Coordinator Training	Operations Training	
305-B Storage Facility	Orientation Program	Building Emergency Plan	Building Emergency Director Training	Advanced Waste Management Training	Container Management
Staff Position					
Technical Group Lead	X	X	X	X	X
Hazardous Waste Operations Staff	X	X	X ¹	X	X

¹ Required for any staff that has been assigned the duties of Building Emergency Director or alternate.

* Refer to the 305-B Storage Facility Training Plan for a complete description of coursework in each training category.

Hanford Facility RCRA Permit Modification Notification Forms

Part III, Chapter 10 and Attachment 51

065055

Waste Treatment and Immobilization Plant

July 11, 2003

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Page 2 of 5: Hanford Facility RCRA Permit Modification Notification Form

Modification of Interim Compliance Schedule Date in Appendix 1.0 to Submit Engineering Information for HLW Vitrification Miscellaneous Treatment Unit:

- Secondary Containment (Item 27)
- Sub-Systems (Item 28) and,
- Sub-System Equipment (Item 29)

Attachment 51, Appendix 1.0, WTP Compliance Schedule

Hanford Facility RCRA Permit Modification Notification Form

Unit:

Waste Treatment and Immobilization Plant

Permit Part & Chapter:

Part III, Chapter 10 and Attachment 51

Description of Modification: The purpose of this modification is to update interim compliance dates in the WTP Interim Compliance Schedule Appendix 1.0 (Items 27, 28, and 29). Modification of these interim compliance dates is necessary to allow for the development and submittal of information for the HLW vitrification miscellaneous treatment unit secondary containment, sub-systems, and sub-system equipment. The original compliance date was based on the availability of melter design and did not include the off-gas treatment train. In addition, WTP project schedules have been rebaselined to reflect incorporation of an additional high level waste melter and deletion of a low activity waste melter to reflect the new 2+2 melter configuration.

Attachment 51, Chapter : 10, Volume II, Appendix 1.0
Redline/strikeout of modification

Appendix 1.0 WTP Interim Compliance Schedule

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	Interim Compliance Date
HLW SHORT-INTERIM MELTER UNIT		
27.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit secondary containment	11/21/03 1/22/05
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system	08/01/03 6/18/05
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system	08/01/03 6/18/05

Modification Class: ¹²³

Please check one of the Classes:

Class 1

Class ¹1

Class 2

Class 3

X

Relevant WAC 173-303-830, Appendix I Modification:

A.5.a

Enter wording of the modification from WAC 173-303-830, Appendix I citation

Schedule of Compliance: Changes in interim compliance dates, with prior approval of the director.

Submitted by Co-Operator:	Reviewed by RL Program Office:	Reviewed by Ecology:	Reviewed by Ecology:
<i>J.P. Henschel</i> 7/16/03	<i>W.J. Taylor</i> 7/15/03	<i>S. Dahl-Crumpler</i> 7/29/03	<i>L. Ruud</i> 7/23/03
J.P. Henschel Date	W. J. Taylor Date	S. Dahl-Crumpler Date	L. Ruud Date

¹Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modifications
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

065055

July 11, 2003

Replacement Sections

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Attachment 51, Appendix 1.0, WTP Compliance Schedule

Appendix 1.0
WTP Interim Compliance Schedule

065055

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	Interim Compliance Date
	III.10.C.2	
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	11/30/07
2.	Submit updated Site Transportation Report for incorporation into the Administrative Record.	12/31/03
	III.10.C.3	
3.	Revise and Submit Waste Analysis Plan and associated Quality Assurance Project Plan to Ecology for review and approval	08/12/05
	III.10.C.5	
4.	Update and submit for approval "Procedures to Prevent Hazards", Chapter 6.0 Sections 6.3, 6.4, 6.5 and the Inspection Schedule.	08/01/06
	III.10.C.6	
5.	Update and submit the Contingency Plan	08/01/06
	III.10.C.7	
6.	Update and resubmit for review and approval Training Program description in Chapter 8 of the Permit.	08/01/06
7.	Submit under separate cover the actual WTP Dangerous Waste Training Plan for incorporation into Administrative Record.	08/01/06
	III.10.C.8	
8.	Update and resubmit the Closure Plan for approval	08/01/06
	III.10.C.11	
9.	Submit Risk Assessment Workplan, revised in consultation with Ecology.	08/15/03
	CONTAINERS	
10.	Submit detailed information associated with containers and container management areas	10/01/04
11.	Submit descriptions of container management practices	08/01/06
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the permit	11/03/03
13.	Submit engineering information for each dangerous waste tank and primary sump to be included in the permit	05/01/04
14.	Submit engineering information for each tank system ancillary equipment to be included in the permit	05/01/04
15.	Submit descriptions of tank management practices	08/01/06
	CONTAINMENT BUILDINGS	
16.	Submit engineering information for each containment building to be included in the permit	02/01/04
17.	Submit descriptions of containment building management practices	08/01/06
	PRETREATMENT PLANT MISC. UNITS SYSTEMS	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	09/16/03
19.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems	10/01/04
20.	Submit engineering information for Pretreatment Plant Miscellaneous Unit	10/01/04

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	Interim Compliance Date
	Systems equipment	
21.	Submit descriptions of management practices for the Pretreatment Miscellaneous Treatment System	07/01/07
LAW SHORT TERM MELTER UNIT		
22.	Submit engineering information for LAW Vitrifaction Miscellaneous Treatment Unit secondary containment	03/01/04
23.	Submit engineering information for LAW Vitrifaction Miscellaneous Treatment Unit sub-system	05/01/04
24.	Submit engineering information for equipment for each LAW Vitrifaction Miscellaneous Treatment Unit sub-system	05/01/04
25.	Submit descriptions of management practices for the LAW Vitrifaction Miscellaneous Treatment System	08/01/06
26.	Submit LAW Vitrifaction Environmental Performance Demonstration Test Plan for Ecology review and approval	08/01/06
HLW SHORT TERM MELTER UNIT		
27.	Submit engineering information for HLW Vitrifaction Miscellaneous Treatment Unit secondary containment	1/22/05
28.	Submit engineering information for HLW Vitrifaction Miscellaneous Treatment Unit sub-system	6/18/05
29.	Submit engineering information for equipment for each HLW Vitrifaction Miscellaneous Treatment Unit sub-system	6/18/05
30.	Submit descriptions of management practices for the HLW Vitrifaction Miscellaneous Treatment System	01/02/07
31.	Submit HLW Vitrifaction Environmental Performance Demonstration Test Plan for Ecology review and approval	01/02/07
32.	Final Compliance Date	12/31/07

Hanford Facility RCRA Permit Modification Notification Form
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

August 21, 2003




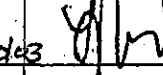
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Modification of Interim Compliance Schedule Date in Appendix 1.0 to Submit Engineering Information for Secondary Containment and Leak Detection System for the Pretreatment Plant Miscellaneous Unit Systems (Item 18).

Hanford Facility RCRA Permit Modification Notification Form

Unit: Waste Treatment and Immobilization Plant	Permit Part & Chapter: Part III, Chapter 10 and Attachment 51												
Description of Modification: The purpose of this modification is to update an interim compliance date in the WTP Interim Compliance Schedule Appendix 1.0 (Item 18). Modification of this interim compliance date is necessary to allow for the development and submittal of information pertaining to pretreatment plant secondary containment and leak detection systems for miscellaneous treatment units.													
Attachment 51, Chapter: 10, Volume II, Appendix 1.0													
Redline/strikeout of modification:													
<p><i>Appendix 1.0</i></p> <p>WTP Interim Compliance Schedule</p>													
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="3" style="text-align: left;">Interim Compliance Schedule- WTP Facility</th> </tr> <tr> <th style="width: 5%;"></th> <th style="width: 80%;">Compliance Schedule Submittal</th> <th style="width: 15%;">Interim Compliance Date</th> </tr> <tr style="background-color: #cccccc;"> <td></td> <td>PRETREATMENT PLANT MISCELLANEOUS UNIT SYSTEMS</td> <td></td> </tr> <tr> <td style="text-align: center;">18.</td> <td>Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems</td> <td> 9/16/03 1/31/05 </td> </tr> </table>		Interim Compliance Schedule- WTP Facility				Compliance Schedule Submittal	Interim Compliance Date		PRETREATMENT PLANT MISCELLANEOUS UNIT SYSTEMS		18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	9/16/03 1/31/05
Interim Compliance Schedule- WTP Facility													
	Compliance Schedule Submittal	Interim Compliance Date											
	PRETREATMENT PLANT MISCELLANEOUS UNIT SYSTEMS												
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	9/16/03 1/31/05											
Modification Class: ¹²³ Please check one of the Classes:	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center;">Class 1</td> <td style="text-align: center;">Class ¹1</td> <td style="text-align: center;">Class 2</td> <td style="text-align: center;">Class 3</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input checked="" type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	Class 1	Class ¹ 1	Class 2	Class 3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				
Class 1	Class ¹ 1	Class 2	Class 3										
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
Relevant WAC 173-303-830, Appendix I Modification: A.5.a													
Schedule of Compliance: Changes in interim compliance dates, with prior approval of the director.													
Submitted by Co-Operator:  F. Beranek	Reviewed by ORP:  R. J. Schepens	Reviewed by Ecology:  S. Dahl-Crumpler	Reviewed by Ecology:  L. Ruud										
8/26/03 Date	8/26/03 Date	9/16/03 Date	9/16/03 Date										

¹ Class 1 modifications requiring prior Agency approval.

² This is only an advanced notification of an intended Class ¹1, 2, or 3 modification, this should be followed with a formal modification request, and consequently implement the required Public Involvement processes when required.

³ If the proposed modification does not match any modification listed in WAC 173-303-830 Appendix I, then the proposed modification should automatically be given a Class 3 status. This status may be maintained by the Department of Ecology, or down graded to ¹1, if appropriate.

Hanford Facility RCRA Permit Modifications
Part III, Chapter 10 and Attachment 51
Waste Treatment and Immobilization Plant

August 21, 2003

Replacement Sections

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Page 4 of 5 See attached replacement section.

Appendix 1.0 WTP Interim Compliance Schedule

Appendix 1.0 WTP Interim Compliance Schedule

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	Interim Compliance Date
	III.10.C.2	
1.	Submit documentation stating the WTP has been constructed in compliance with the Permit.	11/30/07
2.	Submit updated Site Transportation Report for incorporation into the Administrative Record.	12/31/03
	III.10.C.3	
3.	Revise and Submit Waste Analysis Plan and associated Quality Assurance Project Plan to Ecology for review and approval	08/12/05
	III.10.C.5.	
4.	Update and submit for approval "Procedures to Prevent Hazards", Chapter 6.0 Sections 6.3, 6.4, 6.5 and the Inspection Schedule.	08/01/06
	III.10.C.6	
5.	Update and submit the Contingency Plan	08/01/06
	III.10.C.7	
6.	Update and resubmit for review and approval Training Program description in Chapter 8 of the Permit.	08/01/06
7.	Submit under separate cover the actual WTP Dangerous Waste Training Plan for incorporation into Administrative Record.	08/01/06
	III.10.C.8	
8.	Update and resubmit the Closure Plan for approval	08/01/06
	III.10.C.11	
9.	Submit Risk Assessment Workplan, revised in consultation with Ecology.	08/15/03
	CONTAINERS	
10.	Submit detailed information associated with containers and container management areas	10/01/04
11.	Submit descriptions of container management practices	08/01/06
12.	Submit engineering information for each secondary containment and leak detection system for the WTP Tank System to be included in the permit	11/03/03
13.	Submit engineering information for each dangerous waste tank and primary sump to be included in the permit	05/01/04
14.	Submit engineering information for each tank system ancillary equipment to be included in the permit	05/01/04
15.	Submit descriptions of tank management practices	08/01/06
	CONTAINMENT BUILDINGS	
16.	Submit engineering information for each containment building to be included in the permit	02/01/04
17.	Submit descriptions of containment building management practices	08/01/06
	PRETREATMENT PLANT MISC. UNITS SYSTEMS	
18.	Submit engineering information for secondary containment and leak detection system for the Pretreatment Plant Miscellaneous Unit Systems	1/31/05
19.	Submit engineering information for Pretreatment Plant Miscellaneous Unit	10/01/04

Interim Compliance Schedule- WTP Facility		
	Compliance Schedule Submittal	Interim Compliance Date
	Systems	
20.	Submit engineering information for Pretreatment Plant Miscellaneous Unit Systems equipment	10/01/04
21.	Submit descriptions of management practices for the Pretreatment Miscellaneous Treatment System	07/01/07
	LAW SHORT TERM MELTER UNIT	
22.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit secondary containment	03/01/04
23.	Submit engineering information for LAW Vitrification Miscellaneous Treatment Unit sub-system	05/01/04
24.	Submit engineering information for equipment for each LAW Vitrification Miscellaneous Treatment Unit sub-system	05/01/04
25.	Submit descriptions of management practices for the LAW Vitrification Miscellaneous Treatment System	08/01/06
26.	Submit LAW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	08/01/06
	HLW SHORT TERM MELTER UNIT	
27.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit secondary containment	1/22/05
28.	Submit engineering information for HLW Vitrification Miscellaneous Treatment Unit sub-system	6/18/05
29.	Submit engineering information for equipment for each HLW Vitrification Miscellaneous Treatment Unit sub-system	6/18/05
30.	Submit descriptions of management practices for the HLW Vitrification Miscellaneous Treatment System	01/02/07
31.	Submit HLW Vitrification Environmental Performance Demonstration Test Plan for Ecology review and approval	01/02/07
32.	Final Compliance Date	12/31/07

064740

Hanford Facility RCRA Permit Modification Notification Form

Part III, Chapter 10 and Attachment 51

Waste Treatment and Immobilization Plant

July 15, 2003

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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

1315 W. 4th Avenue • Kennewick, Washington 99336-6018 • (509) 735-7581

September 9, 2003

Mr. Roy Schepens, Manager
Office of River Protection
United States Department of Energy
P.O. Box 450, MSIN: H6-60
Richland, Washington 99352-0550

Mr. Keith Klein, Manager
Richland Operations Office
United States Department of Energy
P.O. Box 550, MSIN: A7-50
Richland, Washington 99352-0550

Mr. James Henschel, Project Director
Bechtel National Inc.
2435 Stevens Center Place, MSIN: H4-02
Richland, Washington 99352-0550

Dear Messrs. Schepens, Klein, and Henschel:

Re: Completion of the September 2003 Modification of the Waste Treatment and Immobilization Plant Dangerous Waste Permit

This letter serves to notify you of the Washington State Department of Ecology's (Ecology) final permit decision to incorporate a number of design packages for the Waste Treatment and Immobilization Plant (WTP) into Part III, Chapter 10, of the Hanford Facility's *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste* (WA7890008967). A permit decision will be effective 30 days after the service of this Notice of Decision.

The packages included in this modification are:

- o LAW-005, Rev 0 – Low-Activity Waste (LAW), 3 ft. Elevation, Tank System Secondary Containment;
- o LAW-007, Rev 0 – LAW, 3 ft. Elevation, Secondary Containment for Miscellaneous Treatment Units (Submerged Bed Scrubbers and Wet Electrostatic Precipitators);
- o LAW-008, Rev 0 – LAW, 3 ft. Elevation, Containment building for the Locally Shielded Melter (LSM) Gallery/Finishing Line;
- o HLW-001, Rev 0 – High Level Waste (HLW), -21 ft. Elevation, Tank system secondary containment;

- HLW-002, Rev 0 - HLW, -21 ft. Elevation, Tanks in the Melter Off-gas Treatment Process (HOP) system (Vessel 903 only);
- HLW-003, Rev 0 - HLW, -21 ft. Elevation, Containment building for the Drum Transfer Tunnel;
- PTF-002, Rev 1 - Pretreatment Facility (PTF), 0 Ft. Elevation, Tank System Secondary Containment;
- PTF-003, Rev 1 - PTF, 0 ft. Elevation, Containment Buildings for Hot Cell and Maintenance Area;
- PTF-005 - PTF, -19,-45 ft. Elevation, Tanks for Plant Wash and Disposal (PWD) System
- LAW-001, Rev 2 - LAW Building, -21 ft. Elevation, Secondary Containment for Tank System;
- LAW-002 - LAW Building, -21 ft. Elevation, Secondary Containment for Radioactive Liquid Disposal (RLD) Tank System and;
- LAW-003, Rev 1 - LAW Building, -21 ft. Elevation, Ancillary Equipment for RLD Tank System.

Additional modifications included the deletion of Permit Condition III.10.C.14 (Performance Test Demonstrations) and updating of the Permit sump data tables.

The final permit modification package consists of the Statement of Basis, Responsiveness Summary, and the revised WTP unit-specific conditions and appendices on a CD-ROM. The location of the page changes and design information are noted in the Statement of Basis for the modification. Changes to the permit conditions are noted with single-line strike out for text deletions, and double-underline for text additions.

Hard copies of the information in the final WTP permit modification will be available at the Ecology Administrative Record in Kennewick, the Office of River Protection Administrative Record, and the Hanford Public Information Repository in Richland. The WTP permit modification will also be made available on the Ecology web site. Due to security considerations, design drawings will not be available on the internet, but will be available at the Administrative Record locations listed above.

Ecology would like to remind the Permittees that the approvals granted in this modification are for the purpose of allowing construction to proceed on a specific part of the WTP (e.g., specific secondary containment areas, tanks, ancillary equipment). If other portions or equipment were mentioned in the documents approved, our approval does not extend to other portions of the WTP treatment systems. For example, the System Description for the HOP and Process Vessel Vent (PVV) Systems (24590-HLW-3YD-HOP-00001) has been incorporated into the administrative record. Although the document discusses the off-gas treatment system for completeness, our approval does not constitute an approval of the adequacy of the off-gas treatment system. The permit documents also indicate the instrumentation that the Permittees believe is regulated. Ecology does not currently have enough information to make a determination as to the regulatory status of the instrumentation.

Messrs. Schepens, Klein, and Henschel
September 9, 2003
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If there are any questions regarding this letter, please call Ms. Suzanne Dahl at (509) 736-5705.

Sincerely,

Mike Wilson by Jay Inne

Michael A. Wilson
Program Manager
Nuclear Waste Program

SS:jc

Enclosures

cc: Nick Ceto, EPA
Joel Hebdon, USDOE
Tony McKarns, USDOE
John Eschenberg, USDOE-ORP
Lori Huffman, USDOE-ORP
Bruce Nicoll, USDOE-ORP
Jim Rasmussen, USDOE-ORP
Bill Taylor, USDOE-ORP
Bill Clements, BNI
Bob Lawrence, BNI
Phil Schuetz, BNI
Todd Martin, HAB
Ken Niles, ODOE
Fred Beraneck, WGI
Phil Peistrup, WGI
Steve Piccolo, WGI
Rick Gay, CTUIR
Pat Sobotta, NPT
Russell Jim, YIN

cc/enc: Cathy Massimino, EPA
Ecology Administrative Record, Kennewick
USDOE Administrative Record, Richland
Hanford Public Information Repository, Richland

Basis for Deletion of Pilot-Scale Melter Testing from the Dangerous Waste Permit

Introduction

The Waste Treatment and Immobilization Plant (WTP) Project is required by regulatory permit conditions to perform pilot-scale performance testing to determine whether such testing could affect the operational life of the WTP melters. Research and Testing (R&T) test results obtained since the establishment of this permit condition demonstrate that the concentrations of recommended spike organics will not affect the operational life of the WTP melters.

Background

Reference 1 describes the current WTP requirement for compliance testing. Section III.10.C.14, Performance Test Demonstrations, states; "The performance test program will demonstrate that the melter and melter off-gas systems are capable of 99.99% Destruction Removal Efficiency (DRE) for organics pursuant to Permit Conditions III.10.H.1.b.i. and III.10.J.1.b.i. The test program will include analyses and a demonstration with a pilot scale melter using high concentrations (above rated design limits) of organic spikes in order to obtain detectable output concentrations upon which to determine DRE. The pilot scale performance test plan will be submitted by the Permittees to Ecology by January 31, 2004. Ecology approval of the pilot scale melter test plan is expected by March 31, 2004. Demonstration of compliance with the 99.99% DRE listed in Permit Conditions III.10.H.1.b.i. and III.10.J.1.b.i. in the pilot scale melter shall be conducted in accordance with the approved pilot scale melter test plan and completed by November 15, 2004."

The bases for the pilot testing was WTP technical staff concern for possible risks to the plant melters from processing undefined quantities of organics (Reference 2) that could result in precipitation of reduced metals in the vitrification melters. In early 2002 the number of possible organics and the necessary feed concentrations required to demonstrate the required DRE, particularly candidate organics that are "easy to destruct," was not defined. As the melter feed is heated, the organics behave as reducing agents. Various fractions will evaporate, oxidize in the plenum space, and some will persist in the cold cap and react with oxidants, such as nitrate, in the feed; as well as the metals. Because of the large number of feed constituents and hard-to-predict thermal conditions in the cold cap, the extent of evaporation and reactions between organics and metals can not be predicted. Over-reduction of the melt will lead to the formation of metals and metal sulfides. As a result, empirical laboratory and pilot equipment testing have been performed to measure the effect of organics on glass redox state. The redox state of the glass is inferred by measuring the ratio of Fe^{+2} : Fe^{total} in the product glass. The maximum limit of this ratio is set at 0.3 to assure reduced metals and sulfides do not occur. These compounds fall to the melter floor where they can accelerate refractory corrosion ("downward drilling"). If sufficient material accumulates, power surging, localized overheating of glass, and electrical short circuiting of the electrodes can occur. The Low-Activity Waste (LAW) melter is much more susceptible to these effects than the High-Level Waste (HLW) melter because of the LAW melters' electrode design.

Subsequent to the initial assessment that a large concentration of organics may be required, organic selection will be based on selecting a limit number, i.e., up to three, hard-to-destroy organics based on the Dayton List or similar ranking system. The Environmental Protection Agency (EPA) has agreed to this approach for demonstrating DRE organic requirements in glass are met. WTP also developed a pilot-scale testing approach to utilize a limited number of test organics that are hard-to-destroy and would represent the categories of organics of concern from a risk assessment approach.

Review of Pertinent R&T Results

Pilot melter testing of LAW and HLW flowsheets in 2002 has provided a strong technical basis on which to reconsider the early WTP position. The following information is summarized from subcontractor vendor reports.

The concentration of the organic spikes required to demonstrate a certain DRE value is dependent on analytical detection limits, air sample size, volumetric air flow rates and feed rates. Most of these variables are fixed as a result of EPA method requirements or physical limitations of the melter system. Data from analytical procedures are typically reported with respect to method detection limits (MDL) and estimated quantitation limits (EQL), which can be anywhere from five to 50 times higher. For pilot testing of simulated LAW and HLW melter feeds, detection limits were selected for the purpose of DRE calculations based on previous experience, consultation with various vendors, and SW-846 methods. For testing purposes, expectations were that the spike levels should be sufficient to determine a DRE of 99.999%. Off-gas system flow rates and melter feed rates determined during initial testing provided the basis for organic spiking used in subsequent testing.

Example calculation results to estimate the amounts of spike organics required for pilot testing are provided below. Note that the MDLs are used as the basis for calculation in these examples but the EQLs (which are typically about a factor of ten higher) can be easily substituted.

Assumptions:

- DM1200 air flow rate of 5 dry standard cubic meter(dscm)/minute (min) into the thermal catalytic oxidizer;
- DM1200 melter feed rate of 118 liters (L) per hour (hr)
Volatiles (chlorobenzene, trichloroethene);
- Air: $0.1 \mu\text{g/dscm (MDL)} \times 5 \text{ dscm/min (estimated air flow rate)} = 0.0005 \text{ milligrams (mg)/min};$
- Feed concentration to establish DRE of 99.999%: $50 \text{ mg/min} \times 60 \text{ min/hr} / 118 \text{ liter/hr} = 25 \text{ mg/liter}$
Semi Volatiles (naphthalene);
- Air: $1 \mu\text{g/dscm (MDL)} \times 5 \text{ dscm/min (estimated air flow rate)} = 0.005 \text{ mg/min};$ and
- Feed concentration to establish DRE of 99.999%: $500 \text{ mg/min} \times 60 \text{ min/hr} / 118 \text{ liter/hr} = 255 \text{ mg/liter}.$

Physical and Chemical Property Data of Test Organics (Reference 7):

Chlorobenzene: C_6H_5Cl ; molecular weight (mol. wt). 112.56; 62.04% Carbon; specific gravity. 1.107; boiling point. 131-132°C; flash point. 28°C

Trichloroethylene: $ClCH=CCl_2$; mol. wt. 131.40; 18.28% Carbon; specific gravity. 1.4649; boiling point. 86.7°C

Naphthalene: $C_{10}H_8$; mol. wt. 128.16; 93.71% Carbon; specific gravity. 1.162; melting point. 80.2°C; boiling point. 218°C; flash point. 28°C

A similar estimation has been made for the LAW and HLW melter systems based also on MDL measurement requirements (Reference 3). Each HLW melter has dedicated primary and secondary off-gas treatment systems. Each LAW melter has a dedicated primary and shared secondary off-gas treatment system. For the three Metric Tons of Glass per day (MTG/day) Immobilized High-Level Waste (IHLW) throughput production case it, was estimated that Volatile Organic Chemicals (VOC) spike organics would be required at a melter feed concentration of 78 mg/L. Semivolatile Organic Chemicals (SVOC) spike organics would be required at a melter feed concentration of 780 mg/L. For Immobilized Low-Activity Waste throughput production at 30 MTG/day VOC and SVOC organic spike levels would be 33 mg/L and 333 mg/L, respectively. If a LAW facility performance demonstration were to be conducted with one melter only, these concentrations would be adjusted depending on the total flow to the secondary off-gas treatment.

Testing conducted in 2002 is reported in References 4, 5 and 6. Following the estimation of minimum required mass flux of organic spike chemicals and preliminary testing, Vitreous State Laboratory (VSL) elected to increase the quantities of volatile organic spike chemicals by over 30X to account for any process variability or miscalculations. The actual concentrations tested in the DM1200 pilot melter (DM1200), along with the projected WTP test requirements (Reference 3) are presented in the tables below. Testing is performed on the DM1200 because this pilot test facility includes prototypic primary and secondary off-gas treatment equipment.

Test Organic	LAW Melter Feed Concentration, mg/L			HLW Melter Feed Concentration, mg/L		
	DM1200			WTP ¹	DM 1200 ²	WTP
	C1	A1	B1			
Chlorobenzene	918	793	231	33	354	78
Trichloroethylene	1221	1054	306	33	469	78
Naphthalene	250	216	73	333	31	780
Total	2389	2063	610	399	1177	936

1 – WTP concentrations based on two LAW melters operating simultaneously.

2 – Values represent intended target concentration, test to be completed by June 2003.

NM – not measured

Test Organic	LAW Melter Feed Concentration, mg/min				HLW Melter Feed Concentration, mg/min	
	DM 1200			WTP	DM 1200 ¹	WTP
	C1	A1	B1			
Chlorobenzene	1451	1451	490	1010	531	328
Trichloroethylene	1929	1929	649	1010	703	328
Naphthalene	395	395	154	10190	46	3280
Total	3775	3775	2193	12210	1280	3936

1 – Values represent intended target concentration, test to be conducted by June 2003.

The LAW feed concentrations of organics (given as mg/L) tested in the DM1200 are significantly higher than what would be required for the WTP performance demonstration test. During the LAW C1 test, the feeding period of the organic spike solution was 58 hours. This period of operation produced over three melter tank volumes of glass (~5200 kg). The LAW A1 tests had two distinct periods of melter feeding. Organic solution was fed to the DM1200 for periods of 41 hours and 23 hours. The 41-h period produced approximately 4,100kg of glass which equates to 2.4 melter turnovers. Because the melters behave as well-mixed tanks, three turnovers results in ~95% conversion of the contents of the tank. WTP R&T experience is that the redox state of the glass responds more quickly than the feed periods tested as described above often approaching equilibrium about twice as fast. Therefore, there is a sound technical basis to expect any effect of the organics on the redox state of the glass to have manifested itself within the period when organics were fed to the melter.

No divalent iron was detected in glass samples taken near the end of the LAW A1 and C1 test segments when the organic spike was fed (References 4 and 5). These results are consistent with LAW testing in general, which shows that LAW feeds with target quantities of sugar and waste Total Organic Carbon (TOC) result in fully oxidized glasses. The method detection limit is 0.8% for divalent iron. An appreciable fraction of the organic spike compounds exit the melter without reacting based on the low DRE measured for two LAW tests (see table below). This contributes to the weak affect of the spike organics on the glass redox condition. This conclusion is based on the fact the melter DREs for LAW envelope A and C tests were measured to be,

	Envelope	Chlorobenzene	Trichloroethylene	Naphthalene
Melter % DRE	LAW C1	42 %	53 %	57 %
	LAW A1	0 %	20 %	33 %

To put into perspective the incremental increase in the amount of carbon that would be added to LAW and HLW feeds during performance testing; the following table presents the g/L of carbon in the LAW melter feeds. The incremental increases in carbon of less than 7% as VOC/SVOC are not sufficient to affect the redox state of the LAW glasses.

Carbon Source	LAW A1, grams (g) carbon/L	LAW B1, g carbon/L	LAW C1, g carbon/L
Sucrose	20.9	7.2	1.8
Waste TOC	4	0.8	14
VOC/SVOC	0.9	0.3	1.0

The HLW flowsheet contains trace amounts of TOC. In addition, the use of sugar will vary depending on sludge washing efficiency in pretreatment. The concentrations of TOC, nitrates, and nitrites will dictate if and how much sugar will be required to maintain a suitable glass redox condition. HLW flowsheet testing is currently underway in 2003 to measure the rate of change of the glass redox with increasing concentrations of sugar. To date, sugar concentrations up to 25 g/L sugar (10.5 g/L carbon equivalent) have resulted in acceptable levels of reduced iron in the glass. A future DM1200 HLW test is planned to measure organic DRE in the thermal catalytic oxidation unit. This test will be performed with concentrations of total organics that are only slightly higher than projected for WTP HLW performance testing requirements. The estimated WTP HLW melter feed concentration of test organics would result in approximately 0.8 g/L carbon equivalent. This value is significantly lower than carbon levels tested using sugar. This low carbon concentration combined with the fact that the test organics do not persist in the cold cap to the extent sugar does allows us to conclude that the HLW melter would not be at risk by a performance demonstration test.

Summary

Data produced since early 2002 provides credible evidence that organic DRE performance testing of VOC and SVOC organics at levels required to determine DRE attainment at the end of the off-gas treatment train will not risk the performance life of the HLW and LAW melters.

This determination is based on the following facts:

1. The use of a limited number of hard-to-destruct representative organics is an acceptable

- strategy for demonstrating DRE performance at the end of the off-gas treatment train.
2. The VOC and SVOC test organics to not persist in the cold cap, but rather evaporate or decompose at lower temperatures; thereby reducing their potential effect on the melt pool and melter components.
 3. For LAW envelopes, the concentrations do not significantly increase the total carbon content in the feed such that over-reduction of the glass will occur.
 4. For HLW, the concentrations are below the levels determined to be required to increase the redox state of the glass to the level that reduction of metals and sulfides have been known to occur.

References

1. WA7890008967, Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Chapter 10 and Attachment 51, "Waste Treatment and Immobilization Plant."
2. Evaluation of Ecology's Expectations for the Waste Treatment and Immobilization Plant Melters and Off-Gas System Performance Requirements, 24590-WTP-RPT-ENV-02-002 Rev. 1, S. Hill, et al. River Protection Project, Waste Treatment Plant, 3000 George Washington Way, Richland, WA 99352, February 13, 2002.
3. Calculation: HLW and LAW Offgas Systems VOC Spiking, 24590-WTP-M4C-LOP-00001 Rev. 0A, E. Berrios, River Protection Project, Waste Treatment Plant, 3000 George Washington Way, Richland, WA 99352, February 7, 2003.
4. Integrated Off-Gas System Tests on the DM1200 Melter with RPP-WTP LAW Sub-Envelope A1 Simulants, VSL-02R8800-2 Rev. 0 (In Review), K.S. Matlack, et al., Vitreous State Laboratory, The Catholic University of America, Washington, DC 20064, September 3, 2002.
5. Integrated Off-Gas System Tests on the DM1200 Melter with RPP-WTP LAW Sub-Envelope C1 Simulants VSL-02R8800-1 Rev. 0 (In Review), K.S. Matlack, et al., Vitreous State Laboratory, The Catholic University of America, Washington, DC 20064, July 25, 2002.
6. Integrated Off-Gas System Tests on the DM1200 Melter with RPP-WTP LAW Sub-Envelope B1 Simulants VSL-03R3851-1 Rev. A (In Review), K.S. Matlack, et al., Vitreous State Laboratory, The Catholic University of America, Washington, DC 20064, May 2, 2003.
7. The Merck Index of Chemicals and Drugs, 6th Edition, 1952, Merck & Co. Rahway, New Jersey.